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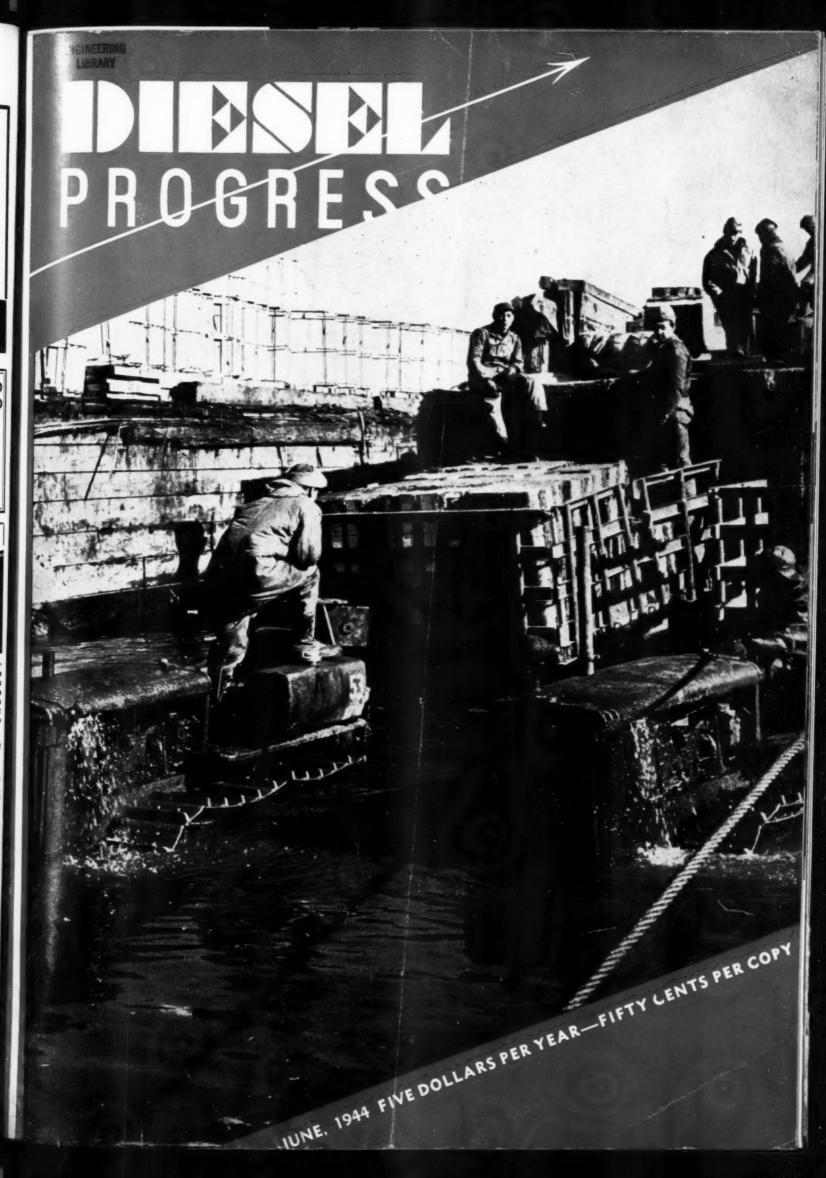
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### **Groundwork for Air Power**

BATTERIES of Diesel-powered Tournapulls, dozers, scrapers, almost overnight transform the rough terrain of invaded areas into emergency landing fields.

Batteries of big stationary Diesels are likewise delivering a wartime power punch, in factories, lighting plants, pumping stations, and vessels of all types.

Regardless of size or type of service, operators everywhere are assured of continuous, full-power performance for longer periods between overhauls when their Diesels are lubricated with Texaco. Texaco Algol or Ursa Oils, for example, increase life of rings, pistons, liners and bearings, keep rings free in their grooves, valves active, ports clear, assuring full piston seal that means maximum power and economy. In fact—

More stationary Diesel hp. in the U. S. is lubricated with Texaco than with any other brand.

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### **TEXACO** Lubricants and Fuels

FOR ALL DIESEL ENGINES

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT-CBS \* HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

#### REX W. WADMAN **Editor** and Publisher

WILBUR W. YOUNG **Managing Editor** 

### HEYWORTH CAMPBELL Art Director

FRONT COVER ILLUSTRATION: Caterpillar Diesel Tractors hauling supplies ashore at a Navy air base in the Aleutian Islands. At high tide, only the tops of the tractor Diesels show above the water.

TABLE OF CONTENTS ILLUSTRATION: Looks like snow but it's salt. At Wendover, Utah, this Caterpillar Diesel Tractor and Athey Mobiloader handle 100 tons of salt an hour.

### **JUNE CONTENTS**

Four-Year Operating Report On La Junta, Col
Six-Thousand H.P. Single Acting Diesel for Victory Ship
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Diesel Engined Salvage Craft
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Training Diesel Men in Miami
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Exchange Your Diesel Maintenance Ideas Section







### FOUR-YEAR

### **OPERATING REPORT**

### LA JUNTA, COLORADO

By RALPH M. OSBORN

THE July 1940 issue of DIESEL PROGRESS carried the story of La Junta's five-year fight for municipal ownership of its generating plant; how through court actions, election of officials who were favorable to city ownership, and strong opposition of the private Utility, La Junta's Municipal League finally won out with a popular referendum authorizing issuance of \$497,000 revenue bonds to finance a new Diesel generating plant. It is recalled that the Colorado Supreme Court gave La Junta the legal goahead July 3rd, 1939 and the new plant with

its three Fairbanks Morse Diesels and generators took the load March 14th, 1940.

Here are a few highlights on the account this plant has given of itself in a little more than four years of operation: The original bonds, bearing 4% interest, were refunded in the first year to bonds bearing 2% interest. By the beginning of the second year the demand had grown to the extent that additional generating capacity was required and a new bond issue of \$108,000 was authorized to finance the purchase

of a 1750 hp. Fairbanks Morse Diesel, generatur and auxiliaries. As of January 1st, 1944 a total of \$216,000 of the bonds had been paid with all interest due, some \$76,000 more bonds paid than were due on that date.

An approximate over-all reduction of 10% in electric rates was put in effect when the plant went into operation and since then the city has enjoyed a further reduction of 5%.

The few forced shutdowns experienced in this plant have run from 5 to 12 minutes' duration and all add up to less than one hour. It is noted that at the end of 1943 the load had increased 84.1% over the load originally assumed by the plant. The accompanying chart of operating figures carries some of the clues to the splendid benefits the citizens of La Junta have enjoyed since public ownership of this utility was inaugurated. It is seen that fuel consumption averaged 12.12 kwh. per gal., that the average over-all cost per kwh. was \$.0091 and the output jumped from 4,900,700 kwh. in 1941 to 9,916,500 in 1943. Out of a possible 41,391,000 rated horsepower hours in 1943, the equipment operated 20,913,800 rated hp. hrs.better than 50%.

The newest unit in the La Junta plant is the

HP No.1. 640 KW 1225 HP No.2. 750 KW 700 HP No.3 420 KW 1750 HP No.4 1200 KW 3264 12 37 150 895 6265 151500 11084 11.86 875 2561 3315 99200 8467 1171 803 5365 2935 290400 22618 1285 168 3493 3638 33500 2720 12.24 238 489 3040 172500 14542 11.82 962 5017 3841 95800 8284 11.56 551 3177 4036 388800 31590 12.27 186 4521 4253 35800 2920 1226 174 754 4578 178800 15344 1145(1552 504) 2780 111800 9740 1147 755 3449 3401 440800 34970 1240 256 5250 3575 July 225900 18992 1216 1516 4046 3000 235000 20524 1156 569 4000 3105 119200 10760 1107 980 4421 4082 266200 21334 1247 160 5623 3961 Ralph M. Oshern SN Engr. BrcPlank Stonley Labora Chi Lorenan ... 90700 7462 1225 727 1733 2540 282200 23737 148755144753 2304 74700 4589 1133 737 2676 2542 466500 50524 13.19 425 7255 2981 | 144400 | 1464 | 1514 | 1504 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 | 1604 690400 57186 1207 3034.58 1455492 4030 964.69 182.00 1.00 75 75 25.44 198462 13842 134179 8610 3927 3259 6199.52 008 1855102 3355 970.94 195.00 1.00 1.00 1.00 1.00 270 277028 5735 1594179 86.10 48.95 3553 659328 0083 1594888 3951 970.94 195.00 1.00 1.00 1.00 4.00 216.96 3216 1594128 86.10 200 4275 1.073 64322.6 1.0087 1. 767200 62974 12.68 3400.60 484.5 1584 201.68 394.6 1861 163.0 4479 1707 169.50 775200 (4038 12.10 3483.67 843800 71018 11.86 3849.50 544.5 (489 235.35 4214 (423 27) 27 42.57 41.19 7089.21 0084 40.43 3845 7117.40 0080 3833 4398 7009.84 0080 884600 71330 124 18344 929500 73510 1244 410921 1876000 3055 98344 205.00 1.25 1.50 2.82 2.14 2917.49 80.05 1541.79 86.10 41.64 3940 7364.85.0079 98344 20500 100 100 100 292119 4101 154179 8610 100844 20500 100 100 100 246 305841 6275 154179 8610 43.79, 37.24, 7596.03.0077 48.71, 71.12, 8332.27.0074 984700 77128 1276 1936147 3163 98344 1114100 88272 1242 4943.25 A230 1353 359.23 2222902 2701 

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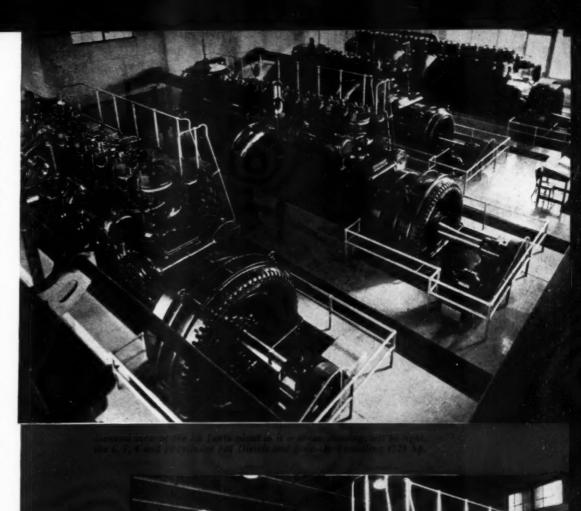
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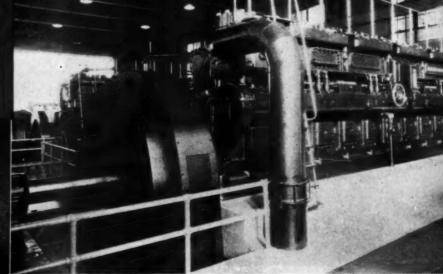
hp. hrs.-

big-cylinder 1750 hp., 16 in. by 20 in. Fairbanks Morse 2-cycle Diesel with its FM alternator and Westinghouse switchgear. Accessory equipment for this unit includes a FM evaporative jacket water cooler, Ingersoll Rand scavenging blower and, attached to the engine, Nugent fuel filters. All four Diesels are equipped with Maxim exhaust silencers. Midwest fuel filters are used between the storage tanks and the engine day tanks.

The three original generating units were Fairbanks Morse Diesels; a four-cylinder, 700 hp., a 6-cylinder, 1050 hp., and a 7-cylinder, 1225 hp. all operating at 300 rpm. and direct connected to FM alternators. These engines were all equipped with Alnor pyrometers and served by a Westinghouse, cubicle-type, metalclad switchboard, a Marley cooling tower of the induced draft type with atmospheric heat exchangers.

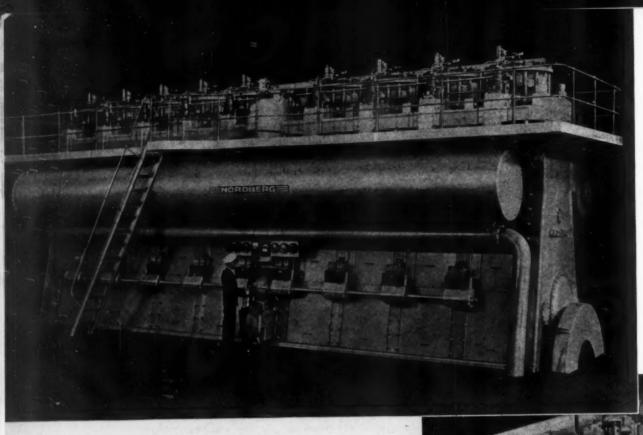
The financial affairs and major decisions affecting the La Junta generating plant are administered by a Power Board whose original members were and are H. B. McClusky, W. A. Schultz, H. F. Nafe and T. F. Pound. Operation of the plant is under the supervision of W. H. Goodhue, Supt. of the City-Owned Utilities and the author.





Closeup of the 10-cylinder, 1750 hp. FM Diesel, newest engine at La Junta.





Nine-cylinder, 6000 s.h.p., Nordberg Marine Diesel which recently completed grueling Navy tests. Note Manzel lubricators for each cylinder and multipoint Alnor pyrometer.

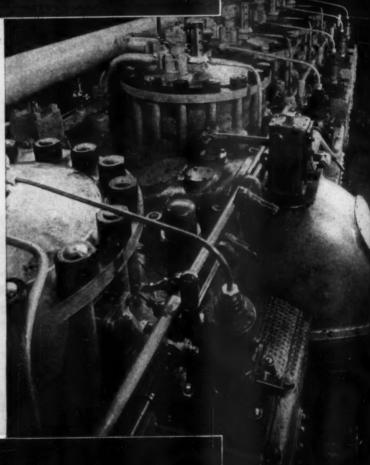
VICTORY SHIP

TO HAVE AMERICA'S MOST

**POWERFUL SINGLE** 

ACTING DIESEL

NORDBERG



Above: View at upper gallery showing cylinder heads, governor and American-Bosch fuel injection pumps.

Left: Exhaust side of the 6000 s.h.p. Diesel with crankcase covers removed to show accessibility of working parts.

DIESEL PROGRESS

NORD sel engine ow build Maritime is typical o ng availa direct driv crew ship ower gen acting, cre at 160 rpr The desig gines of r ceptions; reversing n of the can greater ph this engin pm.; ther ads with heavy fue sults are gine is of

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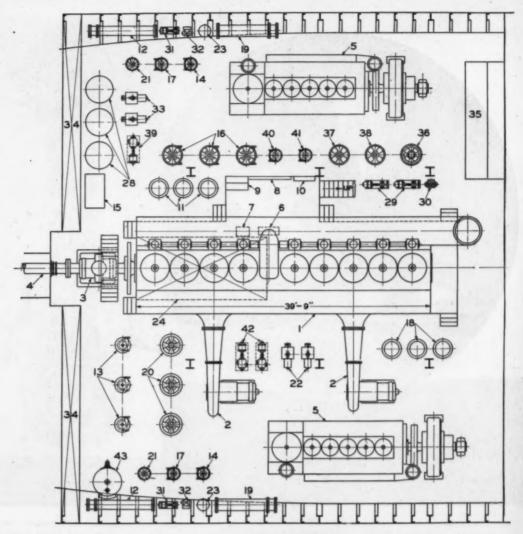
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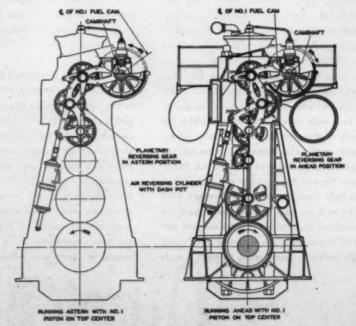
s.h.p., Diesel completed ests. Note for each tipoint Al.

> shown in the illustrations, the test results on this engine tell a most interesting story. The engine was given a 360-hour continuous en-6000 shp. rating. It was then run for 48 hours continuously at 110% load or 6450 shp. at 165 rpm.; then for 2 hours at 125% load or 7300 shp. at 172 r.p.m. Other tests were run to determine starting, governing and maneuvering characteristics, and fuel consumption at various leads with corresponding propeller R.P.M. All tests were conducted with the engine burning heavy fuel oil and the fuel consumption results are shown in the chart above. The engine is of the mechanical injection type with water-cooled fuel nozzles. The fuel consumed during the continuous seventeen-day test at 100%, 110% and 125% loads varied from 1000 to 1200 S.S.U. at 100° F., 11.5 to 12.5 Baume at 60°F., and contained from 11.4 to 17% hard asphalt and 9 to 10% Conradson residue.

NORDBERG Manufacturing Company has announced the successful completion of tests of its newly designed 6000 shp. (normal) Dieel engine which is to power a "Victory" ship now building as part of the United States Maritime Commission program. This engine is typical of a line which the Company is making available in sizes from 4000 to 8000 shp. of 6 to 12 cylinders for single or twin engine direct drive, also twin engine, geared single screw ship propulsion as well as for stationary power generation from 3000 to 6000 kw. The engine here described is a 9-cylinder unit of 29 in. bore and 40 in. stroke, 2-cycle, single acting, crosshead type, developing 6000 shp. at 160 rpm.; B.M.E.P. at this rating is 62 psi. The design of this large Diesel follows the familiar lines of other Nordberg 2-cycle engines of recent years with two noteworthy exceptions; that of the simplified and improved reversing mechanism and the overhead location of the camshaft made necessary because of the greater physical size of this engine. In addition to the general construction, which is durance run at 160 rpm. developing its normal







Schematic arrangement of Reversing Gear for 29 in. bore Nordberg Marine Diesel. Chart, upper left, shows test results not including power to drive scavenging

June 1944

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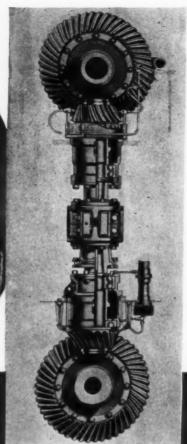
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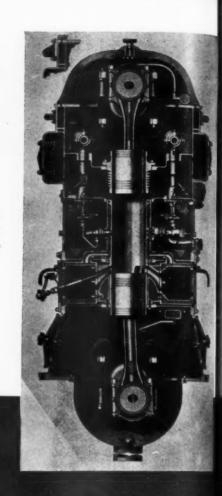
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R. H. Morse, Jr. (seated) and John W. Barriger III, recently appointed Manager of the Diesel Locomotive Division of Fairbanks Morse & Co.

Vertical drive assembly which ties together the upper and lower crankshafts in the FM opposed piston Diesel.

Vertical transverse cross section showing arrangement of upper and lower pistons, intake and exhaust ports and injection nozdes.

Horizo

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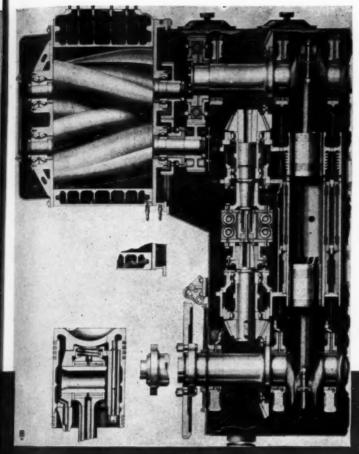
### OPPOSED PISTON DIESEL TO POWER NEW LINE OF LOCOMOTIVES

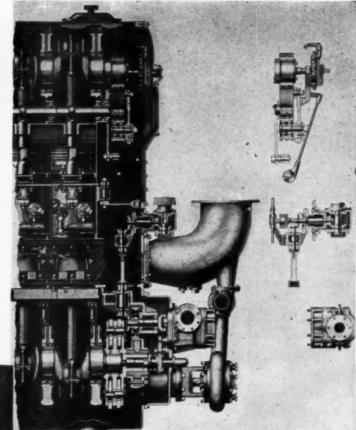
AIRBANKS Morse & Co. recently made a double barrelled announcement which lifted the lid from its opposed piston Diesel-long preempted by the Navy for submarines and surface craft-and brought to light the Company's plans for a line of Diesel-electric locomotives. The newly created Diesel Locomotive Division will be headed by John W. Barriger III, who, since 1927, has been engaged in railway, financial, corporate and related activities which provided him with exceptional opportunities for the study of the physical characteristics, operating and traffic conditions on many of the principal railroad lines of the United States. The new lines of Fairbanks Morse locomotives will include both freight and passenger road types as well as dual service types based on single-engined units which may be coupled and operated, in combinations of two or more units, through multiple unit control to meet a wide

range of speed and power requirements. The line will also include switching locomotives in two capacities, the larger of which will have the characteristics required for operating local freight and passenger trains as well as serving for switching duty.

The underlying princple of the Fairbanks-Morse 2 stroke cycle Opposed Piston Diesel Engine is the use of a plain open ended cylinder in which combustion takes place in the center of its length between two pistons which move away from each other, and in doing so uncover the exhaust and air inlet ports, thus eliminating all valves. The pistons controlling the air inlet ports are connected to the upper crankshaft while those controlling the exhaust ports are connected to the lower crankshaft, the two crankshafts being mechanically connected by means of a vertical shaft and bevel

gears thereby transmitting power from the upper to the lower shaft and maintaining the proper timing between the upper and lower pistons. In reality, therefore, with a pair of pistons in each cylinder, the 10 cylinder engine becomes a 20 cylinder engine. The engines are made in various sizes having from 3 to 10 cylinders and ranging from 150 H.P. to 2000 H.P. The cycle of operation begins with the movement of the pistons from their outer dead centers. After the pistons have covered the exhaust and air inlet ports, the air between the pistons is compressed and as they approach inner dead center, fuel is injected into the combustion space where the heat generated during the compression of the air ignites the fuel. Combustion and the resulting expansion, forces the pistons outward on the power stroke, thereby delivering work to the crankshafts, ... And now please turn to page 74 ...





Horizontal transverse cross section showing scavenging blower, vertical crankshaft drive and one pair of pistons, left, and exterior of cylinders with fuel injectors, cam shaft drive and governor linkage, right.

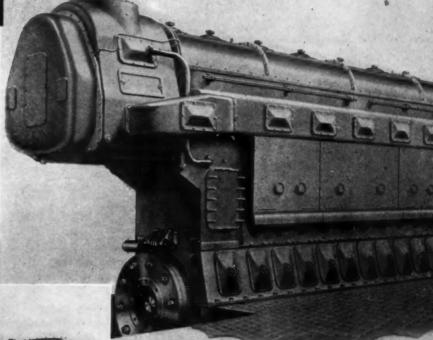
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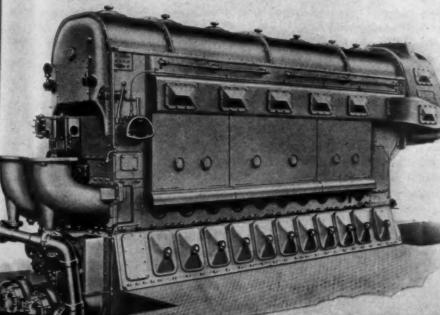
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Three-quarter view from blower end of the 10-cylinder opposed piston FM Diesel.

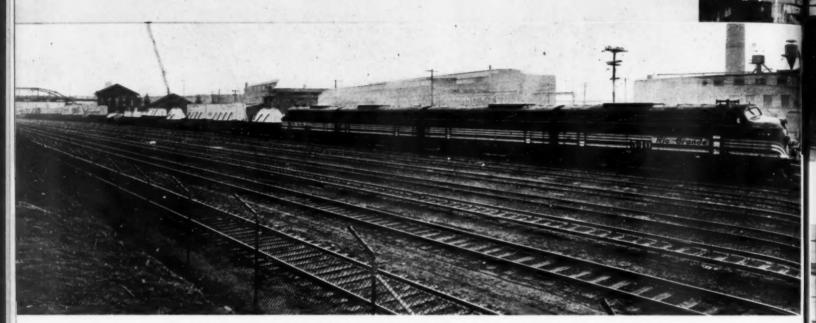




View from control end of the "OP" Diesel showing governor, exhaust connections, circulating water pumps and complete enclosure.

### OVER NORTH AMERICA'S ROOF WITH DIESELS

Part II



The 5400 hp. G-M Diesel locomotive leaving Denver for a fast run to Salt Lake with a solid train of war material.

### Maintenance Records and Operating Costs

By CHARLES F. A. MANN

THE Denver & Rio Grande Western Rail-road believes in keeping a thorough set of books on its fleet of nine 5400 hp. General Motors Diesel locomotives. A railroad emerging from a coal-fired steam operation into a main-line Diesel operation, must watch every step and make sure the sole basis of change is economics and not whimsy or official opinion, prognostication and hope. If Diesels don't pay, scrap them and go back to steam!

Basis of facts is Form 484, a continuous operating record of every big freight Diesel in the fleet, kept on a monthly basis, beside which is a cumulative total to date column, from the exact date each locomotive entered service. Every relevant statistic is included in this form, starting with the mileage and hours in service,

and ending with the cost per 1,000 gross tonmiles, the one statistic every motive power superintendent in the whole world understands.

Space does not permit reproduction of the latest Rio Grande table, to the end of 1943 or the end of March, 1944, but a few groups of figures will give you the answer. We will use the figures as of December 31, 1943.

During that month the high mileage was piled up by locomotive No. 541, which totalled 9011 miles. Low was No. 542 with 7790. Cumulative mileage was on No. 540, however, with a total of 229,070 miles piled up since February 5, 1942, when it went in service. Cost of maintenance and operation, including fuel and crew, turns up three interesting locomotive perform-

ances that gives a fair cross-section of the whole

No. 541, for the single month of December 1943, showed a low total cost per mile of \$1.107. And its lifetime total to that date was \$1.369 per mile for the full mileage since Feb. 26, 1942. (200,895 miles).

No. 543 cost \$1.169 per mile in December 1943, and \$1.479 per mile for a total of 69,837 miles.

No. 540 with 229,070 miles, showed up a December cost of \$1.270 per mile and only \$1.189 cumulative.

Two things stand out: December was a tough month for the Rio Grande's freight power; the

longer the freighters, At the rate per year or reach 600,0 other four the age wh ~around 5 their build

Again, No



Welding a loose front guard member on Diesel locomotive No. 545 at Burnham shops.

longer the Rio Grande operates its Diesel freighters, the less per mile is the average cost. At the rate they run their Diesels—110,000 miles per year or more, at the end of 5 years they'll reach 600,000 miles per locomotive, and in another four years they'll pass a million miles—the age when Mallets usually go to the junkpile—around 25 years out from the day they left their builders.

Again, No. 545, with only 61,043 miles since

June, 1943, turns up with a December cost of \$1.345 per mile and \$1.195 cumulative, or but one cent per mile higher than the oldest in the fleet.

Two Diesels give a clear picture: No. 540 averaged 6.377 gallons per mile of fuel in December, 1943 and a cumulative figure of 6.175. On lube, its December usage was 0.145 in December and but 0.092 for its entire life. (Per mile consumption in gallons).

No. 542 hogged a bit in December, with 7.135 gallons per mile of fuel, and an average of but 6.296 gallons per mile in its lifetime. Lube consumption was 0.169 gallons per mile in December and only 0.095 gpm. cumulative.

Master Mechanic Ralph McLean gives engineer Karl Wurtz final instructions before leaving Burnham shops, Denver.

There are 744 total hours in a month of 31 days. In December, 1943, No. 540 worked 630 hours; No. 541, 648 hours; No. 542, 642 hours and No. 543, 622 hours. Interesting, because it illustrates an almost even line of availability between all the hard-worked locomotives. One works as good as the other. From 10 to 12 hours per month are consumed with regular Federal inspection. 50-71 hours on shop repairs and 30 hours on operating expedients. Percentages of availability, considering the rough, fast work they do over this mountainous line, are, to put it mildly, startling: No. 540 shows a December availability of 84.74%, and cumulative of 82.10%. No. 541, 87.10 for December and 73.51 for the cumulative. No. 542, 86.36 for December and 82.89% cumulative. No. 543, 83.67% for December and 85.05% for the cumulative total.

Strikingly, the Diesels in the Rio Grande fleet

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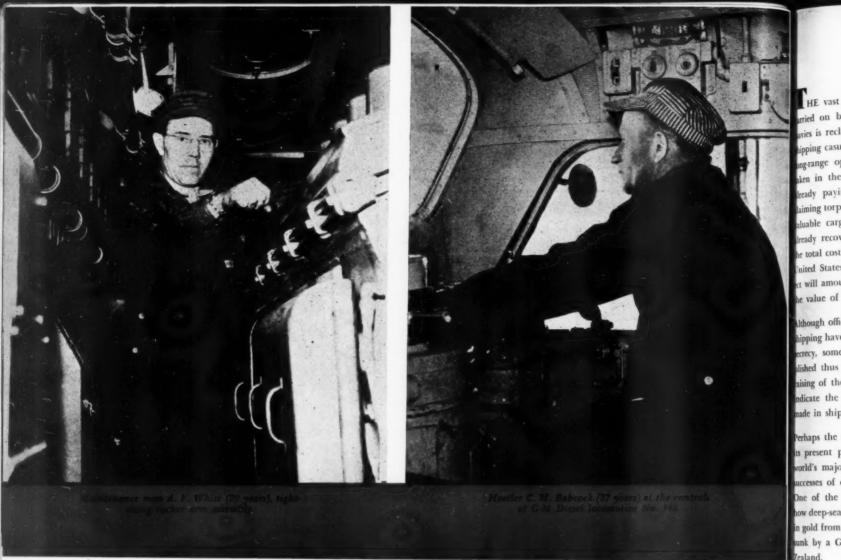
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average 17 to 20 million gross ton miles per month per locomotive. Their monthly average cost for moving 1,000 tons one mile-the GTM. basic figure all motive power is calculated at, runs in a narrow range of 51.9 cents to 56.3 cents. This same figure, cumulative, shows the fleet to run from a low of 41.9 cents on one locomotive up to 56.3 cents. Total averages for the eight 5400 hp. EMC units in service at the end of 1943, show:

81.27% availability; 5,424,756 gallons of fuel used; 87,041 gallons of lube used; average cost per mile, \$1.257; 6.392 gallons of fuel per locomotive mile; .103 gallons of lube per locomotive mile; 2,144,680,000 gross ton miles moved to date @ 49.7 cents per MGTM.

So, we merely point out that when Co-Trustees Swan and McCarthy and General Manager West, started "Going Mainline Diesel," in the face of the cold fact that steam mallets, using low cost, \$2.50 per ton coal, showed a cost of about \$1.70 per mile, the Denver and Rio Grande Western Railroad Company began increasing its net operating income considerably. Diesel fuel oil on the Rio Grande costs about 6 cents per gallon. The company maintains a

complete fuel and lube oil testing laboratory, and purchases fuel and lube on specifications only. They have converted a roundhouse section in Burnham Yard, Denver, into a 7-stall Diesel roundhouse, but modestly insist we skip the details here, as the company plans an ultra modern \$1,000,000 Diesel roundhouse in Denver, second to none in the world. And they plan on it for 1944.

Fined down to a routine that permits half the locomotive maintenance schedule to be done by a travelling Diesel maintainer who rides the big locomotives constantly when in service, this phase of Diesel operation has been so carefully planned by the company, that it is a model for any inteersted railroad to study. Locomotives are operated all the way through from Denver to Salt Lake City. All inspections, running repairs and about half the routine maintenance operations are performed at Burnham, while the other half of the routine maintenance operations and emergency repairs are performed enroute while handling trains. The work is under direction of J. H. Whipple Jr., Diesel Supervisor for the system.

A carefully worked out schedule, calling for the

use of but three forms-A Diesel freight locomotive terminal record; a Diesel freight locomotive trip report and a master schedule of maintenance and operations, kept under glass on a sheet of white paper 30 x 60 inches in size, in the Diesel shops, keeps track of every one of the 140 maintenance and service operations. On the Master schedule, the 140 operations are listed to the left and spaces for 150 round trips across to the right.

Not shown as part of the Diesel operations is the much longer cycle of routine for pulling trucks, done every 170,000 miles; turning wheels at 170,000 miles; changing pinion gears every 250,000 miles and ring gears every 500,000 miles.

The splendid routine procedure worked up by Mr. Whipple is a model for the railroads of America to follow and DIESEL PROGRESS will be glad to reproduce the major part of it in an early issue as prepared by Chas. F. A. Mann, as a service to the American railroad industry and as a tribute to the remarkable work and thought the Rio Grande has put into its big task of organizing and planning a Diesel freight train operation for their whole system if a sufficient number of interested individuals write us indicating their desire for this material.

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In every class salvage vessel ound the sh Ships that ar a large prop atching mat action in pur and fast eme unicatio ship to pro he damage i e made to devised towing absorber and tow the ship overhaul.

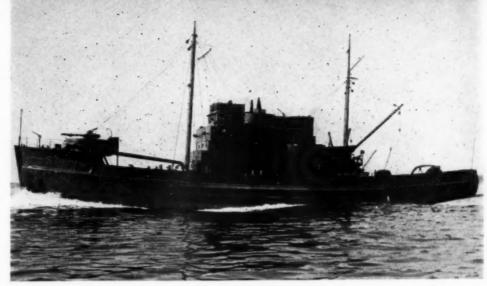
The most sp raising of sur analysis of 1 determining divers have naval engine sealed to ma is only neces water in ord again Diesels ing the air through hose HE vast ship-salvage program now being arried on by the United States and British axies is reclaiming millions of tons of Allied hipping casualties. By far the most pretentious nog-range operation of its kind ever undersien in the history of marine salvage, it is irredy paying tremendous dividends in relaiming torpedoed and bomb-blasted hulks and aluable cargo. On the basis of the volume iready recovered, it has been estimated that he total cost of the salvage ships for this huge inited States-British marine reclamation project will amount to only about one per cent of the value of the materials to be salvaged.

Although official figures on reclaimed merchant hipping have not been revealed due to military energy, some of the exceptional jobs accombished thus far, such as the much publicized aising of the French luxury liner Normandie, adicate the scope of progress that has been made in ship salvaging technique.

Perhaps the advance made in salvage work to its present prominent position as one of the world's major enterprises was foretold in the uccesses of certain recent salvage expeditions. One of the most remarkable projects reveals how deep-sea divers recovered 10 million dollars in gold from the wreckage of the liner Niagara, unk by a German mine off the coast of New Zealand.

In every class of job to be handled by today's salvage vessel, the procedures are all planned and the ship's power supplied by her Diesels. hips that are disabled but not sunk represent a large proportion of the jobs. In such cases, patching mats placed over the holes, plus quick action in pumping out the water taken aboard, and fast emergency repairs to machinery and mmunication systems, will frequently permit a ship to proceed under her own power. When the damage is more extensive and the craft can be made to remain on the surface, a specially devised towing winch, equipped with a shockabsorber and operated by Diesels, is used to tow the ship into port for complete repair and overhaul

The most spectacular phase of salvage is the raising of sunken ships. Careful inspection and analysis of prevailing conditions are vital in determining the procedures to follow. After divers have located and measured all holes, naval engineers specify which holes are to be sealed to make them watertight. Sometimes it is only necessary to plug a few openings under water in order to make the hull buoyant. Here again Diesels are pressed into service for driving the air compressors. By forcing this air through hose lines the water in sealed-off com-



The American Rescue Ship "Lincoln-Salvor" with power supplied by six Cooper-Bessemen Diesel engines, is one of the first to enter service in the huge American-British Salvage Program.

# DIESEL CRAFT SALVAGE HUGE TONNAGE IN "LOST" SHIPPING

partments can be blown out, causing the ship to become buoyant and rise to the surface.

Another practice, commonly used where ships are in shallow waters, necessitates building a cofferdam type structure around selected hatch openings and constructing it high enough to extend above the surface of the water. Powerful pumps, with motive power supplied by Diesel generated electrical energy, then literally "bail out" the trapped water to restore buoyancy.

Where the cofferdam method is not practical, huge pontoons may be submerged and made fast to the wreck, then pumped out to accomplish the same purpose. This type of operation is most satisfactory where relatively small craft, such as submarines, are involved and where the sinking occurs at greater depths. A hydraulically-operated lance is frequently used on such jobs to tunnel channels under the hull and thus permit heavy chains to be passed underneath and around the entire vessel. These chains, connected to Diesel-driven winches, haul the craft to the surface.

In addition to the notable improvements made in the various methods of raising sunken ships, one of the major advancements are the newly designed and extremely serviceable salvage vessels of the types known as the "ARS" and "BARS."

2

Built along the lines of a large ocean tug, these craft are veritable sea-going machine shops complete with lathes, metal benders, drilling and threading machines, and cutting tools. Other shipboard equipment essential to modern salvaging operations includes a 6-ton and a 10-ton hoisting winch, a towing winch, air compressors and elaborate fire-fighting apparatus.

"It is evident that the effectiveness of the power units for propelling these ships and for operating their intricate machinery is of paramount importance," Mr. Williams, of Cooper-Bessemer Corporation, points out. "The success of this salvage work depends to a large extent upon the tremendous power generated by the Diesel engines and the ingenuity in adapting the inherent versatility of this type engine to specific jobs."

The extreme maneuverability and smokeless operation of Diesel vessels are two outstanding characteristics which aid in preventing enemy interference while salvage work is being carried on in war areas.

June 1944

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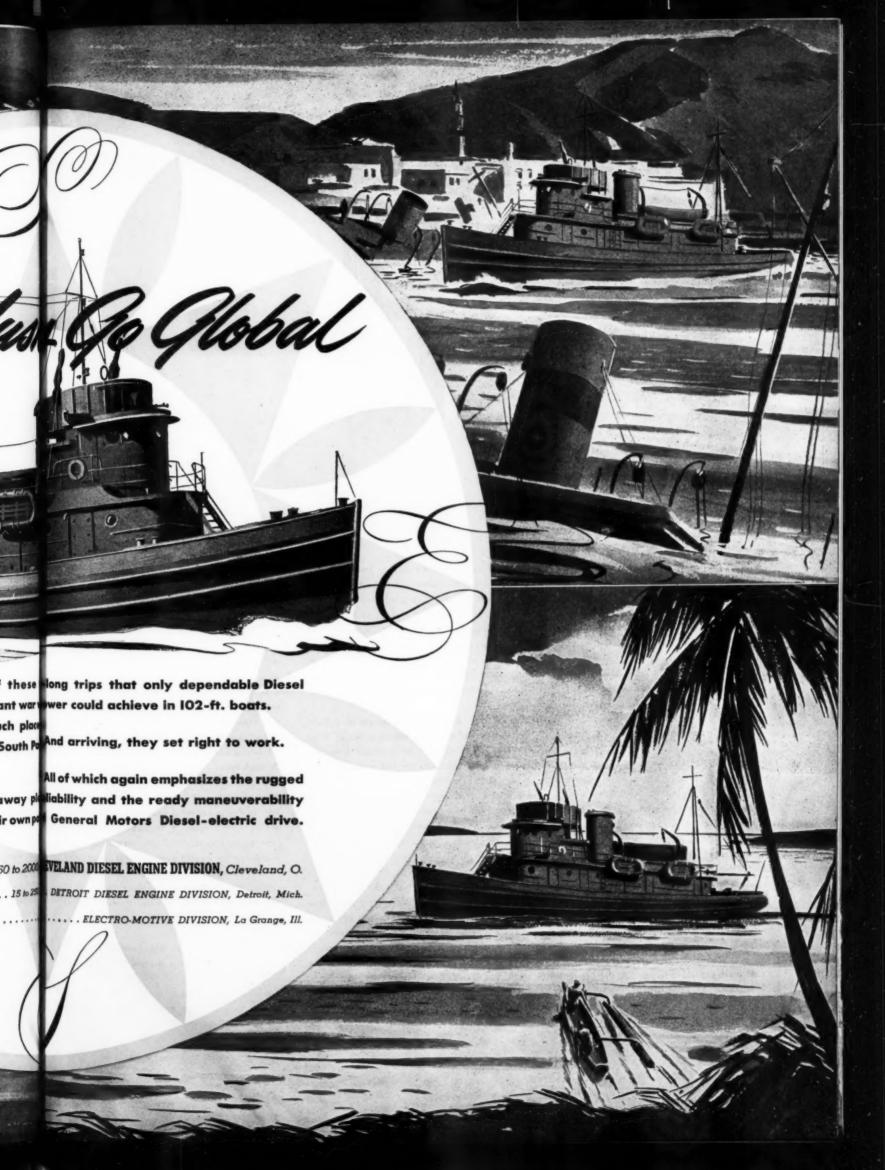
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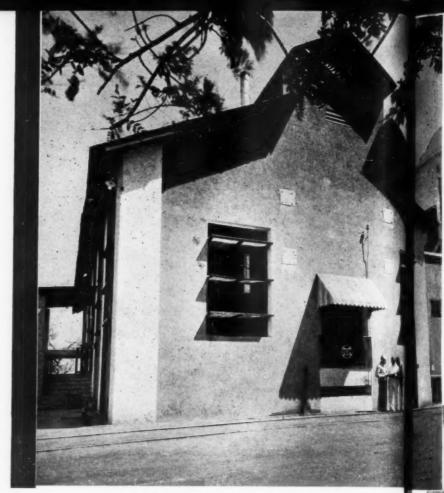
### **DIESELS SERVE**

### LARGE INDUSTRY

 $\mathbf{I}$ 

### **SOUTH AMERICA**

By WILL H. FULLERTON



Power plant of the Santa Marta brewery of the Consorcio De Cervecerias Bavaria in Colombia. Note Naylor exhaust stack through left window, extending above the roof.

ITHIN the comprehensive list of industries in the Republic of Colombia that are and have been depending upon the reliable power of Diesel engines for the past 20 years, perhaps the outstanding from a point of installation difficulties successfully overcome, and the commercial importance of the concern to Colombia, has been the Consorcio De Cervecerias Bavaria S. A., with breweries in Bogota, Barranquilla, Cali, Manizales, Pereira, Honda, Duitama, Cucuta and Santa Marta, with another now under construction in Bucaramanga.

The Consorcio De Cervecerias Bavaria is the largest brewing firm in South and Central America, with a capital of \$40,000,000 pesos. In addition to their breweries, they also maintain factories for the production of malt in the cities of Popayan, Bogota, Santa Rosa and Pamplona, all of which present power problems characteristic of the territory in which they are located. They also have a factory in Bogota manufacturing bottles and other glassware.

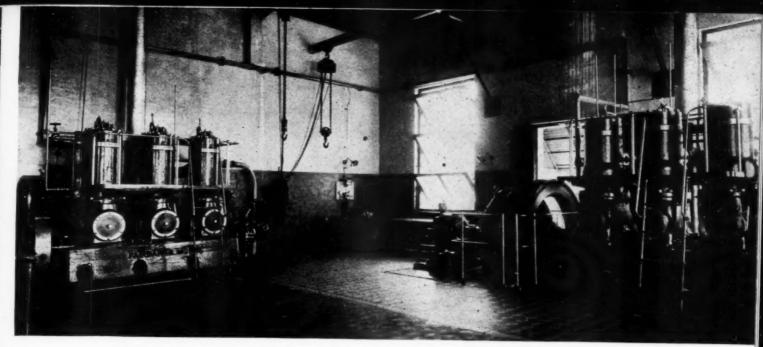
Upon the construction of the Santa Marta brewery about 16 years ago, the problem of power was studied on the basis that it would be extremely expensive to operate the brewery with steam power, even with the then modern Uni-flow steam engine, except during short weekly periods when the actual brewing process called for steam for cooking. The matter of purchased electric power versus Diesel generating units was duly threshed out, with the favor given to the latter type of prime mover. At this time a 180-hp. Fairbanks-Morse 3-cylinder, 14 in. bore, 17 in. stroke engine, direct connected to a Fairbanks-Morse engine type alternator, 3-phase, 60-cycle, 240-v., with direct connected exciter, was installed.

The installation problem consisted in installing the engine on a reinforced concrete arch, the footings of which were insulated from the building foundations to prevent vibration from being carried through to the walls of the building, and with its upper level at a height of 12 ft. from the basement floor, with the engine resting on an island insulated against vibration from the girders supporting the entire engine room floor.

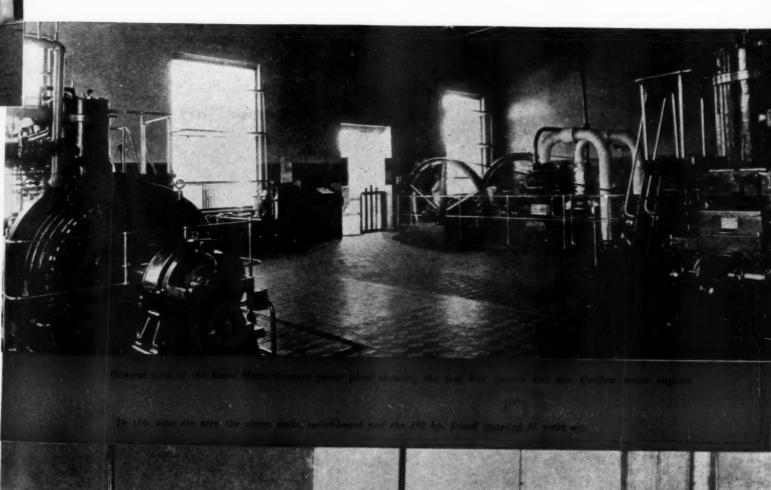
The auxiliaries, such as motor driven air compressor, air tanks, circulating water pumps, etc., were installed in the basement, with operating handles for control of the air tanks carried upthrough the floor, and with pressure gauges located immediately in front of same, on a small panel which also carried the exhaust pyrometer. The air intake filter was located within the arch while the fuel oil tank, supported by angle brackets, was located on the foundation wall at a convenient height. That this installation was entirely successful is proven by the fact that this unit, working on an average 540 hour per month schedule, is still delivering power at or very near the original factory guarantee, with a lubricating oil consumption but slightly higher than that of a new, modern Fairbanks Morse Diesel installed a few years ago. This is further borne out by the fact that when the increased sales of the now famous "Nevada" beer made it imperative to increase the power capacity of this brewery, a Fairbanks-Morse 225-hp. Diesel-electric set was decided upon.

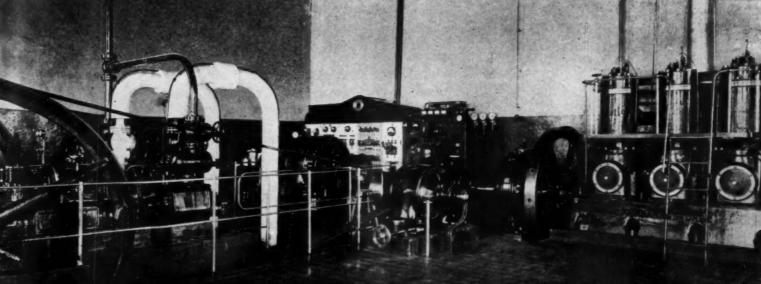
The method used in the installation of the first unit was followed out in the installation of the new engine; a revamping and interconnection was made of the circulating water system with a locally designed and constructed cooling tower with by-pass piping to the different sections of the tower to meet the needs of cooling capacity in accordance with radical seasonal changes.

While the Santa Marta installation is the only one of ten brewery installations equipped with F-M Diesels in this locality, its satisfactory performance is expected to lead to installation of similar Diesel prime movers in several other plants of this company.



The left hand unit, a 180 hp. F-M Diesel, in service 16 years, was recently augmented by the 225 hp. F-M Diesel, seen right.





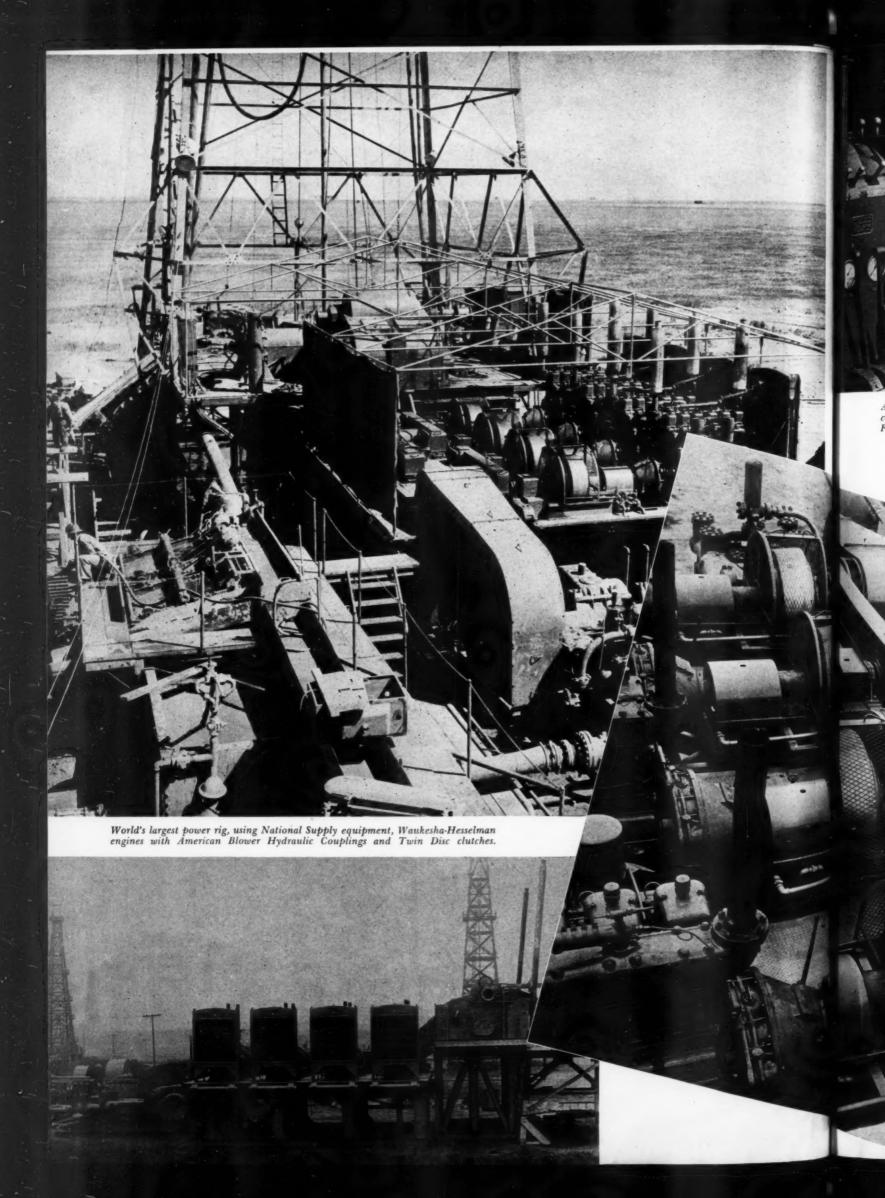
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Above: Drillers stand showing drawworks and engine controls. Below: Closeup of Hydraulic Couplings and Four-Engine Chain Drive Compound Unit.

### MR. BIG IN PETROL

By JIM MEDFORD

SEVEN come eleven—Waukeshas to the right of 'em, and to the left of 'em for the petroleum that a fellow back around the Potomac named Ickes says is getting scarcer than a thin file in the office of PAW. By wider and wider margins, since 1938, the race to find new oil resources has been a losing battle and in 1942 less than 20 per cent of the oil used was replaced by new fields. The trend to Diesel and heavy oil engines for critical power demands plus the war requirements ever pushes the search farther afield and deeper into the bowels of this tortured sphere.

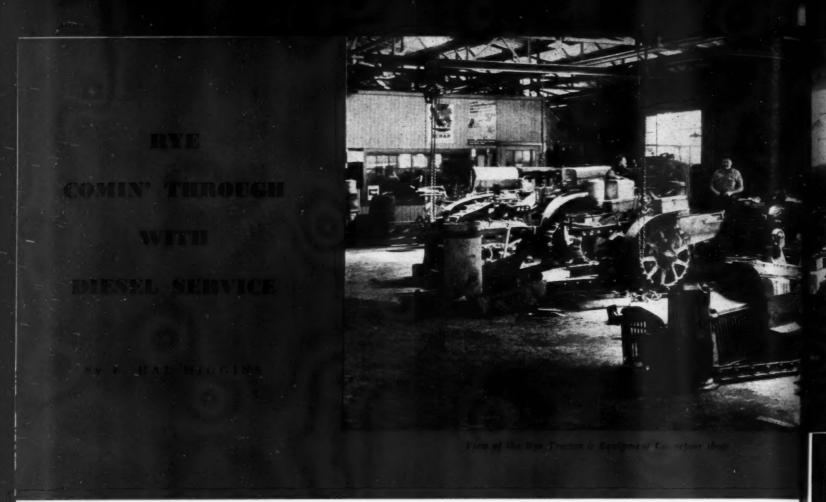
Producing at maximum efficiency today, roughly 4,400,000 barrels of crude and natural gasoline per day is the production figure. And regardless of curtailed consumption, rationing and all, that total barrels just about holds its own smack on the barrel head. Now the point has been reached where, like the hungry cat that was allowed but one mouse a day, the barrel is consumed immediately it comes out of the hole.

To meet just these conditions and to give flexibility and standby emergency power when located in isolated places, the rig and power layout here pictured was developed by the National Supply Company and the Waukesha engine people for the Superior Oil Co., of Los Angeles—the world's largest power rig for California or Australia drilling.

Engineering developed through many years of deep well drilling practice is behind this National Type 125 consolidated rig and National Type C350 73/4 by 18 power pumps with four six-cylinder, 81/2 by 81/2, 282 continuous horsepower at 900 rpm., Waukesha-Hesselman engines for main power.

In addition there are two Waukeshas of same dimensions driving the two mud pumps and another similar engine driving an auxiliary mud mixing pump. Other auxiliaries including generators and pumps are driven by four cylinder Waukeshas, 140 hp. at 1,200 rpm.

The six main engines shown in photographs are all arranged to drive through American Blower hydraulic couplings, the answer to problems involving difficult starting, overloads and torsional vibration and providing shockless operation, fast acceleration and quick clutch maneuvers. Multiple engine installation was featured for compound flexible power application, 300-500 hp. being required for rotary table and 300-400-hp. for pump.



DIESEL dearth vs. Diesel demands by farmers has made Jim Rye about the most important man in San Jose, California. Jim is the president of Rye Tractor Co. with headquarters in San Jose and a branch at Hollister. Santa Clara County happens to be the second U. St. county in farm tractor population and grows one third of all the prunes produced in the world. Also 30% of California's fruit, ranking high in apricots and pears; and standing eighth in the state's county rank on vegetable production.

So, your Old Reporter rolled down to see Jim in his office the other day, after being sidetracked a half day while Jim attended a Red Cross meeting. Just to give DIESEL PROG-RESS a bit of Rye background from the writer's recollections, so you know he is something of an individual, and not "just another tractor dealer," we might turn the clock back 17 years to Jim's start as a Cat man. Since his first connection with the factory in March, 1927, he has been successively Western Credit Manager. Assistant Treasurer, Assistant Sales Manager of the Western Division, and finally a roving trouble shooter at the bottom of the depression when factory and dealers were in the red and no one could tell whether most dealers were more broke than solvent or how long they would last. It was then that the canny Scotch in Rye's pedigree and his sound credit and business training came to the dealer front to save the day. Rye was handed the job of going out and living with the dealers, one after the other, until he worked out each one's salvation or

liquidated him. He saved most of them, and today, many millionaire dealers from Coast to Coast might well hang pictures of Jim Rye and the Caterpillar Diesel tractor side by side over their office and home fireplaces as the double answer to their success. But at the time Jim was analyzing their dealerships and telling them what to do to survive, the sandy little factory credit man was as ruthless as an Army surgeon. "You have such and such liabilities and assets," said Rye, as he laid it on the line. "Have your wife let that maid go, sell three of your four cars, cut Junior's allowance to \$1 a week, cancel that lease on that high-priced corner you occupy and move out to the edge of town on the main highway. Then, if you get the \$175,000 business you think you see for next year, you'll get by. Otherwise, you are broke and I can't recommend your retention in the Caterpillar dealer organization. We can even back you for \$25,000 to get you thawed out and selling tractors again."

So, we find Jim Rye today as head of his own company at a time when men who thrive on trouble-shooting are handy fellows to have around. And that's what Santa Clara Valley farmers, business men and War Board have discovered. They all rate Rye tops in their business of wartime food production.

"Today 85% of my business is parts and labor," explained Jim, as he relaxed in his office to answer questions. "With the greatest dearth of Diesel tractors today in the history of the

tractor, due to the State-County quota system, Caterpillar Diesels are in demand as never before. This being an agricultural territory, the Diesels are the smaller models, nothing over 40 hp. Quality and parts are winning the battle and giving our product and our dealership a stronger position in this area than we ever enjoyed before.

"Caterpillar has done an outstanding job on parts service. With 95% of my Diesels D2 and D4 models, we can concentrate on keeping those all rolling for the farmer while building up all the old gasoline models that come into the shop. Look at those 62 tractors now in being repaired and put in working order for farmers. Note there are six old 2-ton Holts, half with the name Holt down the side, which means they are 25 years old and more. Well, Caterpillar developed a critical list of parts hard to get. The district representatives made a physical inventory of every dealer's stock in the West. Then, whenever a dealer runs out and has to call San Leandro for a part from this critical list, the service manager there can pick up the phone and call the nearest dealer who has a few extras of that particular part, and it is immediately dispatched by rail, bus or air, as time and distance dictate, for results. A part might be rushed down from Salt Lake to me here. It is a mutual inter-changing sys tem on critical parts that has simply saved the day on many an occasion and made our service something the farmer banks on that we think he won't forget when war ends. It has made the

dealers rea they share themselves wartime.

"Look at steadily rated for parts from 1939, was discrete slightly to next year 96.40%. A increased parts stock it stood at Result, no

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dealers really brothers instead of rivals, too, as they share each others critical items and help themselves, their factory and their country ir.

"Look at our service record and how war has steadily raised my parts stock and percentage of parts furnished from my stock here. Back in 1939, when war started, 89.5 of the parts used were filled from my stock. In 1940, it rose slightly to 91.4%; in 1941, it went up to 94.7%; next year to 95.8%, and in 1943 touched 96.40%. And my parts investment, or stock, increased nearly 300% in that era. My 1939 parts stock figured \$14,700; and in Feb., 1944, it stood at \$39,300. These are wholesale prices. Result, not much turnover but better service.

"An example, we had an old Twenty that was 12 years old sent in for its first overhaul that stood \$861 when done. That gave the farmer a practically new tractor good until the end of the war when he can get the Diesel D2 he wants. In new tractors, I received 28 new Caterpillar Diesels last year. I'll be lucky to get 10 this year. The public gets lots of 'headline tractors' that never get to the farm in these war times, you know. I could have used 1,000 Diesels crawlers this year if I could get them.

Same all through the list of farm implements to be pulled by the tractors: Disks, should have 100; get 22; plows, want 60, getting 19. I will get one manure spreader and one end-gate seeder. This is our toughest year, and on the farmers who need tractors and tractor-powered machines, it is even harder. The factories in many cases couldn't get help to make up the material allotted to the factories for farm

Diesels today.

"My service crew has doubled since war started, coming up from 18 to 35 men with wages up from 75 cents to \$1.15 an hour. I will soon roof over the back yard of this shop so men can all work under shade and out of rain. There are 62 units of every kind and date of tractors now in the shops here. Add Hollister and it totals 85 repairs jobs now in the works. And I have only two new Diesels on the floor, both to go out in a day or two. That big one was ordered more than six months ago."

One big wartime point to note in the Rye story is that he is located in the San Francisco Bay area where the housing and labor problems are as tough or tougher than anywhere else. Yet, he has met the competition for labor and pays the scale that gets quality labor that sticks.

Rye is coming through the war in a bigger relative position as regards competitors and customers than he occupied before war. His product, his service and his sound business sense makes the combination that delivers under tough going.

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OGRESS



Miami Vocational School Trains 'teen Age **Students In Diesel Course.** 

By HARRIE H. BIERMAN

Sanford Bearman, Diesel Department head, explains fuel injection to a student. HE ever-broadening use of Diesels, afloat and ashore, has created a bigger demand for Diesel engine operators, maintenance men and mechanics. Recognizing this fact, the Dade County Board of Public Instruction (Miami, Florida) has incorporated into its already-existing vocational-training program an effective system for building up a larger Diesel-engine Manpower Pool.

> While the Diesel-engine Course is comparatively new, the school, of which it is a part, has achieved in recent years an outstanding successful record in the training of teen-age youngsters and adults in a wide variety of skilled "trades" and non-mechanical vocations. Among trade courses taught are automotive repair, machine shop, acetylene and arc-welding and various electrical subjects. The latter include the installation, operation and maintenance of electrical apparatus, such as motors, generators and radio equipment.

The Technical High School, into which vocational-training courses are integrated, is housed

in a 15-story concrete-and-steel structure at the intersection of N. E. Second Avenue and 14th Street in Miami, Fla.

Splendidly equipped, the Diesel-engine schooling-course is located on the building's ground floor. Here, trainees are taught not only the practical side of Diesel-engine work but also the reasons for doing what they do.

Following the same pattern as the school's other vocational instruction-setups for teenagers, the Diesel-engine course is open to 9th grade male graduates who are 15 years of age or older, provided they have a bent for me chanical subjects. The latter qualification is determined, first, by pre-enrollment interviews and, later, by means of a three-weeks' screen-out

Regular courses carry for a 2-year or a 3-year period. The shorter-length instruction qualifies a trainee for a Trade Certificate. Satisfactory completion of the 3-year course entitles him to a High School Diploma. Trainees, who com-



Home of the Dade County Technical High School in Miami, Florida.

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P. W. Seagren, Principal, explains school facilities to prospective trainee.

plete courses of either length, however, may elect to take supplementary training in other subjects, such as machine shop, welding or electrical motor-generator maintenance and repair.

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Diesel-engine courses are conducted under the general supervision of P. W. Seagren, Technical High School principal, and under the immediate direction of Sanford Bearman, Diesel department head. The latter is equipped with a practical, as well as a theoretical, knowledge of his subject. At one time, he operated a Diesel and gasoline-engine repair shop for his own account. Later, he served as assistant engineer and chief electrician on several Diesel pleasure craft.

The Diesel-engine shop, where the practical portion of the work is carried on, occupies a space approximately 40 ft. by 60 ft. Dieselengine equipment includes an Atlas Imperial, 60 hp., 3-cylinder, stationary engine; a Caterpillar 102 hp., 4-cylinder, tractor type engine; a Cummins, 66 hp., 4-cylinder, bus type engine; a Hercules, 77 hp., 6-cylinder truck type engine; a Waukesha-Hesselman, 215 hp., 6-cylinder, marine type engine; a Waukesha-Hesselman, 189 hp., 6-cylinder, tractor type engine; and a Lister-Blackstone, 12 hp., 2-cylinder, stationary model.

The two Waukesha-Hesselman's, the Atlas Imperial and the Caterpillar were purchased new. The other engines named were second hand, when bought. The Waukesha-Hesselman's, the Hercules and the Lister-Blackstone are equipped with American-Bosch injectors. The Caterpillar and the Cummins units have injectors of their manufacturers' own make.

The Atlas Imperial is air-started. The Cater-

pillar and the larger Waukesha-Hesselman are gasoline-engine-started. The smaller Waukesha-Hesselman, the Cummins and the Hercules start by storage battery. The school's equipment includes a home-made, portable battery recharger and a Sullivan 250-lb. air-compressor.

The Diesel engines mentioned are intended for demonstration and manipulative use. For practical instruction in the theory of internal combustion and for "tear down" purposes, the school has two "junk" engines of single-cylinder type. One of these is a vertical, blow-torch-started semi-Diesel. The other is a gasoline engine.

The operating engines are serviced for fuel and cooling water in practically the same manner in which they would be, if they were being used for normal power-development. Fuel is stored underground, outside the building, in a 1,000-gallon supply tank. From this, it is pumped to an 85-gallon day tank by an electrically-operated Viking pump, powered by a ½ hp. motor. From the day tank the fuel is distributed by piping to the individual engines. Cooling water is piped to the latter from the city water system.

All operating engines are equipped with muffling devices of standard manufacture, including Burgess and Maxim. Exhaust gases from each engine go to a 6-inch pipe leading to the building's stack.

Among the Diesel department's minor equipment items are spare pumps, injectors and governors for instructional use, a 31/2-ton, laboratory-type hydraulic press, and electrically-powered tools, such as a valve refacer, a drill press and grinders of portable and bench type.

A 6-ft. by 14-ft. tool room at one side of the shop is well stocked with a wide variety of special tools, such as a complete kit for American-Bosch injection systems and OTC liner pressers. Tool boards hold a nice assortment of small tools—wrenches, pliers and the like.

Compiled by Bearman, the blueprint for practical instruction consists of upwards of 40 "Lesson Plans," which cover the functioning, maintenance and repair of each Diesel-engine part, together with the use and care of necessary tools.

The use of "visual aids" is a favored part of the teaching technique. Blackboard sketches to illustrate the verbal answer to a trainee's question are constantly employed. The school has also projection equipment, and uses instructional motion-picture films, when ever available. The practical training in Diesel-engine work is supplemented by classes in "related subjects." The latter consist of Science, Shop Mathematics, Shop Drawing and Trade Economics. Streamlined instruction in these subjects cover only the portions directly "related" to the practical work taught.

Conducted at night, the Course is popular with Diesel-engine men as a means of broadening the Diesel-engine knowledge they already have. And with gasoline-engine men the Course appeals as a quick method of extending their acquaintanceship with internal-combustion engines to include the high-compression types.

Begun in October, 1942, the Diesel-engine training course for adults is entirely practical in its character. No classroom work is included. As a part of its War Production Training Program, the cost involved is borne by the Federal Government.

Returning to the Teen-Agers, the training of whom is, after all, the school's chief objective: Started in September of last year, the Dieselengine Course now has an enrollment of approximately 40 trainees. Divided into two classes of 20 students each, this number is just about maximum for efficient handling with present facilities.

Financially, "Tech High" is supported by Federal, State and County funds in the ratio of 50%, 25% and 25%, respectively. In regard to the earlier-established courses, such as welding and the electrical subjects, the money spent in the vocational education of teen-age youngsters has paid fine dividends. Graduates already are doing good "specialty work" in the armed forces. And many are employed in widely scattered war industries.

The Diesel-engine Course is too-recently set up to have proven itself, as yet. But the instructional methods used have amply demonstrated their worth in other fields, as above stated. However, none of the Dade County Technical High School's supervisory or teaching personnel believes that graduates of the course will emerge from shop and classroom as full-fledged Diesel operators, maintenance men or mechanics.

Nevertheless, these teen-agers should make better-than-good junior assistants in Dieselengine operation and maintenance. And given a few years of actual shop or engine-room experience, these youngsters should develop into first-class Diesel engineers and repairmen.

June 1944

### WHAT!

### FLUID DRIVE A SWING BRIDGE?



Pontoon swing span over 100 feet in length operated by a gasoline engine with American Blower Fluid Drive installed between engine and gear box.

Yes, the principle of Fluid Driving through a hydraulic coupling can be, in fact is being, used to advantage in a floating swing bridge.

In this unique and unusual application, American Blower Fluid Drive makes possible a smooth start, permits flexible throttle control of bridge movement without engine stalling, and eliminates "jerking" of cables and burning of clutches.

Right now American Blower Fluid Drives are being built for a wide variety of uses in the war effort: on auxiliary superchargers, on warplanes, in warships, cargo vessels, and for application in public utilities and other vital war plants.

After Victory you can depend on American Blower to furnish Fluid Drives to help you set the pace of progress.



Cutaway view of American Blower Fluid Drive. There is no mechanical connection between driving and driven members.



### AMERICAN BLOWER

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Division of AMERICAN RADIATOR & Standard Sanitary Corporation





know the importance of high quality, dependable starting and generating equipment for Diesel engines. That's why they specify AUTO-LITE.

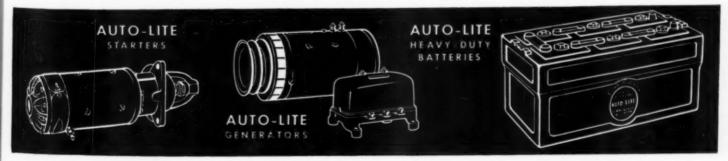
Thirty-two years of experience in building automotive electrical equipment have given AUTO-LITE the know-how and the facilities for helping Diesel manufacturers to solve difficult problems of electrical starting and generating.

Engineers and executives interested in Diesel manufacture are invited to consult Auto-Lite on problems involving electrical cranking or generating equipment.

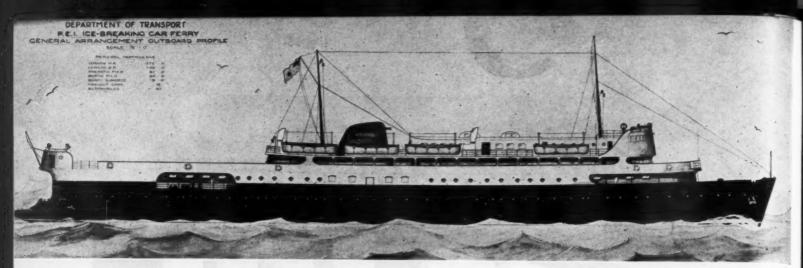
THE ELECTRIC AUTO-LITE COMPANY
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GRESS



Artist's conception of the 12,000 hp., Diesel-electric ice breaking car ferry being built in Canada for service between Port Borden, P.E.I. and Cape Tormentine, N.B. N.F.B. Photo.

### 12,000 H. P. DIESEL-ELECTRIC

HE Honourable J. E. Michaud, Minister of Transport, has announced that Marine Industries Limited of Sorel, P.Q. have been awarded the contract for the construction of a new icebreaking car ferry to operate between Port Borden, P.E.I., and Cape Tormentine, N.B. The keel for the new vessel has already been laid. The ferry will carry railway passenger and freight cars, automobiles and buses as well as passengers. This will be the finest craft of its kind in service in any waters, Honourable Mr. Michaud said, and will be operated for the Government of Canada by the Canadian National Railways. The contract calls for completion and delivery of the vessel before the winter of 1945 and the estimated cost is four million seven hundred fifty dollars.

Design plans for the new vessel were made by Messrs. German and Milne, naval architects and marine surveyors, Montreal, after exhaustive investigation in conjunction with Canadian National Railway officials into the potential railway and automobile traffic to and from the province of Prince Edward Island and other sections of the Dominion. Public meetings were held in Charlottetown and Summerside attended by all interested parties and expert advice was obtained from captains who have commanded craft in the Government ice-breaking operations. The new car ferry will be notable for its outstanding appearance as well as its serviceability. Its engines will be more powerful than any other craft of its kind, generating 12,000 bhp. In the construction of the vessel all the latest advances in shipbuilding

# ICE BREAKING CAR FERRY

and marine engineering will be incorporated, combined with special features to meet year round service problems in the Northumberland Strait. The vessel will withstand the most severe ice conditions and will be able to operate through field ice as well as packed ice. Iceworthiness is considered to be of prime importance in the construction of the vessel.

The main feature of the new vessel will be its propulsion machinery. Eight powerful Diesel engines with electric generators capable of producing 12,000 bhp., will operate four sets of propelling motors each connected to separate propellers—two forward and two aft. This will permit of extreme flexibility in throwing a concentration of maximum power from the Diesel engine generating sets onto one propeller in an emergency. The forward propellers will

• greatly improve the ice-breaking efficiency and will permit greater ease of maneuvering such a large vessel in the restricted terminals.

Diesel-electric propulsion is recognized as the most efficient motive power for the purpose for which this vessel is to be used. It is in successful use on ice-breakers in Russia, Finland, Sweden and the United States. By use of electric transmission, remote control of the propelling motors from the bridge provides for instantaneous response to the orders of the navigating officer through conveniently located control levels. The utmost precision of control is possible. An infinite number of speed changes will be available and it will be possible to apply power to a choice of propellers. Ample safety devices will be provided for any emergency condition of operation.

The new ferry will be completely electrified. In addition to the electric power required for propulsion, Diesel-electric engines will generate electricity for lighting purposes and operation of equipment approaching the requirements of a city of the size of Summerside, P.E.I. The Diesel engines will be manufactured by the Dominion Engineering Co. Ltd., Montreal, and the electrical equipment for the vessel will be constructed by the Canadian General Electric Co. Ltd., in their plant at Peterboro, Ont.

The new vessel will be neat in appearance with its streamline design. Its equipment will be substantial but not gaudy. It will have five (And now please turn to page 76)

# CORRECT Lubrication means Better Maintenance



**CORRECT** lubrication makes for better maintenance by preventing excessive wear.

Because no one oil meets all requirements Sinclair provides both Rubilene and Gascon Oils for correct lubrication of DIESEL ENGINES. These oils are safe lubricants under today's continuous heavy duty oper-

ation. Their range is suited to all service conditions.

Where prolonged heavy duty operation threatens excessive wear there is a lubrication problem. Consult us about it.

(Write for "The Service Factor" — published periodically and devoted to the solution of lubricating problems.)

### SINCLAIR INDUSTRIAL OILS

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June 1944

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### SUPERVISING & OPERATING ENGINEERS' SECTION

### TEST INSTRUMENTS NECESSARY TO GOOD PLANT MAINTENANCE

Part 2.

By R. L. GREGORY\*

A T THE recent meeting of the Midwest Power Conference in Chicago, the writer was very much interested in a paper presented to the general session by Mr. W. A. Perry, Superintendent of the Electric and Power departments of the Inland Steel Company at East Chicago, Indiana. The subject of Mr. Perry's paper was "Maintenance Systems."

Mr. Perry covered the subject in a masterful manner, giving all the various phases of maintenance work, as they found them in their plants, and stressed the point, which the writer brought out in last month's issue of DIESEL PROGRESS, that the basic principal of good maintenance work depended upon a thorough knowledge of the equipment and its condition. He further stated that the only way to obtain this knowledge was by use of test instruments and apparatus.

In the last issue of DIESEL PROGRESS the writer discussed briefly the use of the engine indicator, inside micrometers, strain and deflection gauges. In continuing this discussion the first item will be the use of the vibroscope.

This instrument is one which actually takes a picture of the cycles of vibration on any unit. While many smaller plants probably would have no immediate use for this instrument, the larger Diesel operated plants can gain a lot of valuable information from its use. It is particularly valuable in plants where the units range from 6 to 10 cylinders as pictures can be taken at various points along the unit and thus the character of vibrations at various points of the unit can be detected. It is a fine instrument for use in plants, where steam turbine units are in operation also, since graphic pictures can be procured at the various points of shaft bearing.

Any plant with a good mechanic, should be equipped with a set of good adjustable tram gauges. These are easily made and are excellent in tramming the different settings. For instance take the setting of the adjusting nuts

on the scavenging piston to procure the proper clearances. Once these clearances are set, and the jam nuts in place, bench marks can be checked occasionally to see that these settings are being maintained. This is just one of many uses to which the tram gauges can be applied.

Every plant should have a megger for testing units for grounds, testing of generator leads and windings, etc. The field circuit, brush leads, rheostats and generally switchboard windings should be periodically checked for grounds by attaching one lead of the megger to the connections and grounding the other lead. The megger should then be turned at a gradually increasing speed until a maximum reading is obtained. The standard should be approximately 3 megohms of resistance for each 1000 volts. In other words if a generator is rated at 2300 volts, the resistance should show approximately 7 megohms to be considered safe for operation. If below that in all probability the windings or cable leads are dirty or have accumulated some moisture, which should be located and removed. Of course many units, which are kept clean and are operated in a dry atmosphere will show a much higher resistance, some of them even approaching infinity. Transformers, oil breakers and other switching equipment should all be periodically tested to ascertain that the insulation is standing up under operation and not deteriorating to a point where a flashover or breakdown may occur, which will cause a serious shutdown.

Along with a megger for testing insulation resistance, every plant should have a clamp-type ammeter. These are easily applied to various circuits and in conjunction with a good voltmeter, line loads can be checked. Phases can be checked to see that the load is as evenly distributed as possible, and from the results the power factor can be checked.

A good test gauge is of vital importance to every plant. In the operation of any power plant, many gauges form a functional part of operation. These gauges must be kept accurate, otherwise the operators are at a loss to know just what pressures and temperatures they are operating under, and a defective gauge can cause a lot of useless worry and trouble at times. Due to the nature of Diesel operation, and the more or less vibration encountered in larger units, gauges are subjected to severe strains, which often throw their delicate mechanism out of adjustment. You have all observed many times, that gauges on various units vibrate constantly. Where this occurs there is a rapid amount of wear on the racks and linkage and before you know it the gauge is giving an incorrect reading. Where this occurs the gauges should be tested and properly set, worn parts replaced, and a good grade of gauge snubber installed to take the vibration.

Some engineers have been heard to remark that it is nice to have all this equipment, but it runs into a lot of money, when you consider how seldom it may be necessary to use it. I will grant that such equipment costs money, but so do outages and breakdowns that could be avoided by being forewarned. Money spent in such equipment is certainly good insurance and many a serious shutdown has been avoided by engineers who believe in the owning and proper use of good test equipment.

It is a foregone conclusion that no plant can keep up a good maintenance program without a thorough knowledge of equipment conditions, and guessing is a very poor substitute for accurate knowledge of functional and operating conditions. On the other hand many engineers are able to get by for a time with their units but over a period of time, any test equipment which you may have to spend money for, will pay good dividends if you adopt measures to take care of defects which this equipment will reveal. Test instruments are invaluable if properly used, and just as much care should be given them, in the matter of keeping them well cleaned and lubricated, as you would give any other part of your equipment.

Many plants have good mechanics who are interested in learning the operation of these instruments and in procuring accurate results with them. Many of thees men are capable of making tools and apparatus which will be of value in carrying on maintenance work. This

(And now please turn to page 86)

<sup>\*</sup> Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.

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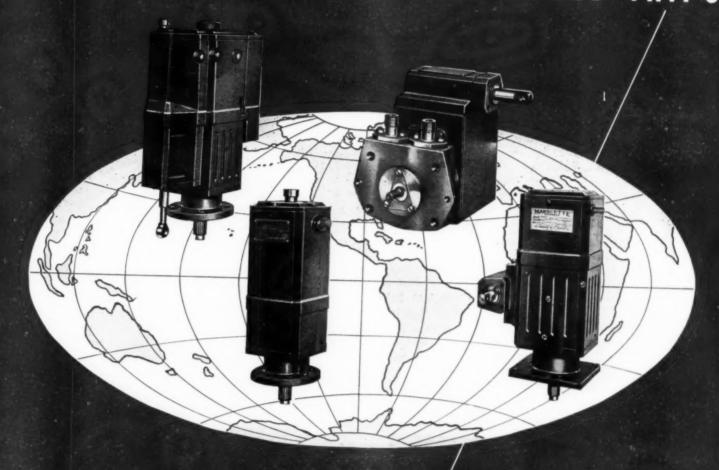
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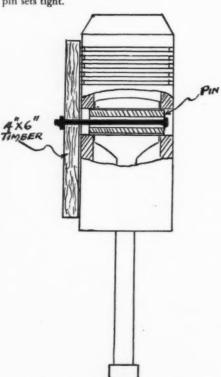
### Exchange Your Diesel Maintenance Ideas

Conducted by R. L. GREGORY

Editor's Note: In this department we provide a meeting place where Diesel and Gas engine operators may exchange mutually helpful maintenance experiences to keep our engines in top condition. Mr. Gregory edits your material and adds constructive suggestions from his own wide experience. This is your department-mail your contributions direct to DIESEL PROGRESS.

### **Method of Removing Piston Pin**

TO make it easier and quicker to remove the piston pin from the piston, a bolt is placed through the center of the pin and a timber or cross arm is placed on one side of the piston with the bolt through the timber. As the pin may set in the piston very tight, a hard wood block is used to drive the pin and at the same time the nut on the through bolt is kept tight so as to exert a pull on the pin. I have found this method a time saver especially when the pin sets tight.



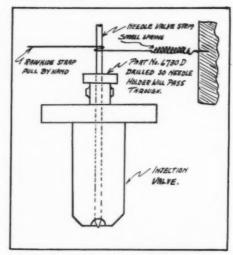
### "Simple Method Used in **Grinding Injection Valves"**

MR. M. L. Monson of the Fosston, Minnesota, Municipal Light and Power Plant has sent in the following contribution:

Method of removing piston pin.

"I have noted in some of the recent issues of DIESEL PROGRESS, various methods used by engineers in reconditioning fuel valves, compressors valves, etc. Here is how we lap in our fuel injection valves on our Fairbanks-Morse Units. This same method could probably be used on injection valves in other types of Units.

"This method is simple and easily arranged. After cleaning the valve and seat thoroughly, and placing the compound or grinding agent on the valve, a rawhide strap is wound around the valve stem two or three times. One end of this strap is fastened to a spring of sufficient tension to pull back when the rawhide is released. This spring in turn is fastened to a bracket or wall.



Method of grinding injection valves.

"The other end of the rawhide strap is pulled by hand and the travel should be such that the valve turns at least one full turn on the seat. Such an arrangement is shown in the attached cut and has proven very satisfactory in reconditioning our injection valves."

### "Fuel Shaft Trouble"

THE following contribution was recently received from Mr. Ernest E. Didier of the Municipal plant at Osage City, Kansas:

"A few days ago we began to experience trouble with one of our units. The trouble seemed to be in regulation and from the performance of the unit, we at first thought that the source of this trouble could be traced to the governor. The governor was thoroughly inspected but no trouble located. This forced us to look further and we finally found it in the fuel shaft.

"The shaft which does not have a rapid movement, had been in service about three years and we had been using a rather heavy lubri-

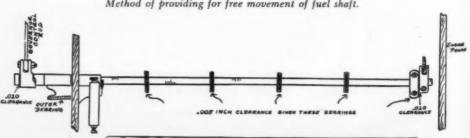
cant in the bearings. The shaft being steel and the bearings of cast iron, we felt this type of lubricant to be sufficient. When the unit was cold, the movement of the shaft in the bear. ings was perfectly free but after the unit had been in operation for about four hours, the shaft would become tight in the bearings, thus eliminating the freedom of movement in the throttle rod and hold it in one position.

"When a load would hit the engine, the throttle valve being frozen in the one position, the speed of the unit would drop, or if the load was suddenly released, the engine would speed up until it kicked off, due to the tripping of the overspeed governor.

"We found that due to expansion of the unit after several hours operation, the use of too heavy a lubricant also, that the tolerances on the cast iron bearings were not enough, causing a binding in the bearings. We remedied this by increasing the tolerances as shown in the cut and by use of a lighter lubricant, and have had no further trouble from this source."

Mr. Didier has brought up a point here that can be well watched by all operators, and that is the use of lubricants unsuitable for certain classes of operation. Also many of us are often likely to suspect governor troubles, when the fault lies elsewhere. Of course governors are not immune to trouble, but as constructed today, and properly inspected and lubricated, they seldom are the cause of much difficulty.

On the other hand, during the past few years, many of our units have been subjected to abnormal loads. This condition has brought up points in operation, such as stresses, unequal expansion of some parts, and other conditions not normally experienced, which we must be on the lookout for constantly. In designing a unit, the manufacturer designs it for certain specific conditions and limitations, which in most instances should be adhered too. Or, as in most cases these limitations cover an overload period for short durations of a few hours. Therefore if the unit is subjected to prolonged periods of operation beyond these limitations, one must be constantly on guard for the unexpected.



Method of providing for free movement of fuel shaft.

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## A New Sperry Gyro-Compass points the way to <u>Invasion Beaches!</u>

JUST A FEW WEEKS AGO, the Navy revealed one of its well-kept secrets . . .

> Hundreds of smaller craft of the Navy are now equipped with a new Sperry "invasion gyro-compass."

Back in 1940, our Navy foresaw the need for a small, lightweight gyro-compass. Specifications were drawn up and Sperry engineers went to work.

In record time, the new smaller brother of the standard Sperry Gyro-Compass (Mark XIV) was ready for production. Now, in hundreds of small Navy craft it is pointing the way toward enemy beaches, playing an important part in split-second invasion schedules, saving men's lives in landing them at assigned points.

The Sperry Mark XVIII is

only nineteen inches in diameter, and the same height as the standard Sperry Gyro-Compass. Although light in weight, it is rugged. Except for a voltage regulator and repeaters, everything is contained in the binnacle.

All the Sperry Mark XVIII Gyro-Compasses in production at Sperry and at a Navy prime contractor, Package Machinery Company of Springfield, Massachusetts, are needed at present for landing craft, submarine chasers, and merchant vessels of our Armed Forces.

But the advantages of a small, rugged, lightweight gyro-compass are so great that peacetime will find production of the Sperry Mark XVIII continuing for many types of small vessels.

### Sperry Gyroscope Company

Great Neck, New York . Division of Sperry Corporation

GYROSCOPICS • ELECTRONICS • AUTOMATIC COMPUTATION SERVO-MECHANISMS

### Opposed Piston Diesel, Continued

The burning and expanding of the gases continues until near the end of the powerstroke. At this point the lower piston uncovers the exhaust ports allowing the burned gases to escape to the atmosphere. The upper pistons next uncover the inlet ports and air supplied by the blower, rushes into the cylinder, cleans out all burned gases and at the same time produces a whirling motion in the scavenging air which continues throughout the compression stroke and injection period and contributes to the complete combustion of the fuel. Thus during but one revolution of the crankshaft, compression, injection, combustion, expansion, exhaust and scavenging takes place.

### W. D. Smith Appointed Worthington Commercial **Vice President**

WORTHINGTON Pump and Machinery Corporation has appointed Walter D. Smith of Tulsa, Oklahoma as commercial vice president. A graduate of Carnegie Institute of Technology. Mr. Smith has been connected with the Worthington organization since 1923, except for a period of three years, 1933-36, when he was vice president and general manager of the American Natural Gas Company of Shamrock,



Walter D. Smith

For the past four years Mr. Smith has been manager of Worthington's Tulsa District Office, as well as southwestern manager of the Engine Sales Division.

In his new capacity, Mr. Smith will supervise the corporation's business in the Southwest, where the oil and gas industries are large users of its products.

### Jesse H. Eilar Appointed to **Perfect Circle Statistical Staff**

HAGERSTOWN, Ind.-According to Don H. Teetor, General Sales Manager of The Perfect Circle Company, Jesse H. Eilar has just been appointed to the statistical staff at the Hagerstown Plant. Mr. Eilar will work under the supervision of Harry B. Marsh, Manager of the Statistical Department.

Mr. Eilar, who for the past eleven years has been connected with the New Castle, Indiana schools, began his duties April 10. For the past six years Mr. Eilar has been Principal of the New Castle Junior High School. Mr. Eilar is widely known throughout Indiana. He has A.B., B.S., and A.M. Degrees from Indiana University, and is now working on his Ph.D. In addition, he was formerly connected with the Hoosier Manufacturing Company and Chrysler Corporation of New Castle.

### What do You want to know about Diesel Cooling?



That's not just a question, but an offer!

There are Ross sales-engineers in practically every principal city from coastto-coast to tell you what you want to know about your particular cooling problem-land or marine.

and if you want a general idea on how completely Ross covers all cooling requirements, write for either or both of these factual catalogs:

For smaller engines — BULLETIN 4922 For larger engines — BULLETIN 5322 ROSS HEATER & MFG. CO., INC. Division of AMERICAN RADIATOR & Standard Sanitary Corporation

GENERAL OFFICES AND PLANT:

1425 WEST AVENUE, BUFFALO 13, N. Y.

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prove the effectiveness and dependability of this single-tube, hydraulic system.

THE SPERRY **EXACTOR**HYDRAULIC REMOTE CONTROL

saves engineering effort, installation time and material



Here's what the Sperry EXACTOR offers Design Engineers who are looking for an accurate, time-saving, and effective device to solve their remote control problems:

### SIMPLE APPLICATION, FLEXIBLE INSTALLATION

A SINGLE TUBE – easily bent to fit installation requirements – eliminates design problems usually encountered with mechanical linkages and other control systems. Just bend the tube around obstacles. Forget pulleys, bellcranks, etc.

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Accurate to a fraction of a degree through 55° motion. Instant control, without backlash. You get positive and reliable action without the need of auxiliary power. Vibration proof. Means is provided for periodic temperature compensation. Capacity 400 inch-pounds in one direction and 100 inch-pounds on the return.

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### 1200 H.P. Car Ferry Continued

decks: lower deck, main or railway car deck, and mezzanine, automobile and boat decks. It will load railway equipment and motor vehicles from the aft end as the bow is knife-like for ice-cutting operations. All navigating appliances aboard the new craft will be the most modern available and every precaution is being taken to make the vessel as fireproof as possible. It is well sub-divided and every care has been taken in the design to provide the utmost

margin of safety against casualty.

Statistics of the new quadruple screw ice-breaking railway car ferry are given below.

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### E. H. Mintie Appointed By Air-Maze

AIR-MAZE Corporation announces the resignation of Mr. E. B. Treidler and the appointment of Mr. E. H. Mintie as direct factory representative and field engineer for the states of California and Arizona, with headquarters in Los Angeles.

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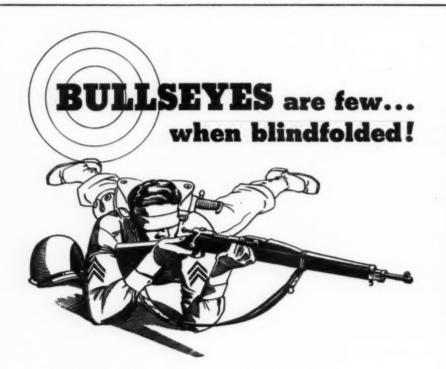


E. H. Mintie

Mr. Mintie, a graduate mechanical engineer, is a native Californian and has been engaged in engineering, design and sales work in that area for the past twenty years.

### Aircraft Engines of the World, 1944

THE new 1944 edition of the international reference book, "Aircraft Engines Of The World," by Paul H. Wilkinson, has just been announced. The new edition of this reference book contains standardized data pages (in Eng lish and metric) with full page illustrations of 130 of the latest aircraft engines including ten of the new airborne auxiliary engines. Also included are condensed data on 275 models of these basic power plants. Separate sections of the United States, France, England, Germany, Italy and Japan. Specifications of the Guiberson, Daimler-Beng and Junkers aircraft Diesels are included. There are 142 illustrations, a total of 320 pages, size 6 in. x 9 in.; price \$8.50 postpaid. Order from DIESEL PROGRESS.



VISCO-METER\* is the one device that tells just what the lubricating oil is doing at all times when an internal combustion engine is running. All other methods are guesswork in varying degrees...similar to a gunner trying for Bullseyes while blindfolded. VISCO-METER\* shows when oil has "outworn" its usefulness and is too thin to protect against friction. It tells when to drain the crankcase and fill with fresh lubricant or build up a safe viscosity by adding heavier oil. By following this

procedure, the engine gets every minute of wear safely out of every quart of oil, Oil waste is minimized. Lubrication failures are safeguarded. It is one effective method of prolonging the life of essential internal combustion engine parts.

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You can't afford to miss the complete
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\*Fully covered by U. S. and Foreign Patents



# Your order now will make for POST-WAR ORDER IN INDUSTRY

Like any other good American organization, Busch-Sulzer stood by for orders from Washington after December 7, 1941. Since then, we have been working 'round the clock on Diesel engines or war materials for the Army, Navy and Maritime Commission and on engines for high priority. We intend, of course, to continue doing so until Washington says that the "end of the beginning" has turned definitely into the beginning of the end.

When peace comes, it is vital that America keep as many of its workmen busy as is possible. Some industries cannot escape labor layoffs during the period of re-tooling. Not so the Diesel industry if...

The "if" means if it has work to do.

The work should be there if the plans are well-ordered, because there is a great need for Diesels because of obsolescence, because of interrupted enterprises and enterprises planned. Little can be expected from Europe, some of whose Diesel plants have been bombed out of existence or badly damaged.

Busch-Sulzer has expanded its facilities greatly since 1941 and has increased its carefully trained personnel by 50 percent in the last 20 months. We are anxious to keep these men and machines busy and help to achieve the peacetime stability that all of us yearn for.

Please send us your inquiry now so that your requirements can be met without further loss of valuable time when capacity becomes available.

BUSCH-SULZER BROS.-DIESEL ENGINE COMPANY
SAINT LOUIS

AMERICA'S OLDEST BUILDER OF DIESEL ENGINES



REGRESS June 1944

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### **Hendy Issues Diesel Catalog**

THE new Hendy stationary and marine series "50" Diesel engines are fully described in a twelve-page catalog recently released by the Joshua Hendy Iron Works of Sunnyvale, California. The catalog contains general specifications and power curves at speeds ranging from 400 to 600 rpm. A chart is also included showing general dimensions.

Each of the 22 Hendy Diesel features is illustrated and described. These include dual in-

take and exhaust valves, unit-type injectors, oil-cooled pistons, jet circulation of cooling water, welded-steel engine bed, removable steel-backed bearings, large-capacity cooling pumps, full pressure lubrication and many others.

Hendy is back by 87 years of power plant experience. Although new in the Diesel field, its achievements in the production of marine engines established new records in this line.

Copies of the series "50" Diesel bulletin are

available on request by writing to Box 5%, Joshua Hendy Iron Works, Sunnyvale, California.

### Volney Fowler Appointed To Electro-Motive Division

APPOINTMENT of Volney B. Fowler as Assistant to Vice-President, to have charge of advertising and public relations of the Electro-Motive Division of General Motors, was recently announced by C. R. Osborn, Vice-President of General Motors and General Manager of Electro-Motive Division. Mr. Fowler is now located at the Electro-Motive plant at La-Grange.



Volney B. Fowler, recently appointed Assistate to the Vice President, Electro-Motive Division of General Motors.

Following twelve years in the editorial deparment of the Indianapolis Times Mr. Forder went with General Motors Export Division to have charge of publicity in 1929. In 1932 he went to the Detroit office of the Department of Public Relations of General Motors and wat in charge of this office when he was put in charge of public relations of the General Engine Group in 1937. He has held the latter post until the present appointment.

### 1943 Editorial Index Now Available

A COMPLETE index of all articles and eftorial material with a cross index of authorwhich appeared in the 1943 issues of DIESE PROGRESS is now available. Copies of this ten-page index will be mailed upon requiswithout charge. Write direct to DIESE PROGRESS, 2 West 45th Street, New York 15 N. Y. for your copy.



# A SIMPLIFIED ALL-DIRECTIONAL VIBRATION ISOLATOR

Korfund engineers have designed the new Model SL Vibro-Isolator to utilize the advantages of four well known models of Korfund Vibration Control within one simplified unit—thus providing a mounting capable of absorbing vibration in all directions at unusually low cost.



Steel springs, with the usual Korfund adjustment feature, for the control of vertical vibration, combined with self-adjusting isolation members for the control of lateral vibration, are incorporated within the all-welded structural steel housing of the new Model SL mounting.

This new unit will be found useful for all purposes and particularly in marine equipment installations where the forces due to rolling and pitching of the vessel must be taken into consideration.

Write Dept. D for full particulars.

THE KORFUND COMPANY, INC.

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THE acquisition of another new factory buildng is announced by Felt Products Mfg. Co. The new building, which will be an addition to the plant buildings already occupied, is a

wo-story structure containing 55,000 sq. ft. of

Felt Products Mfg. Acquires Additional Block-Long

factory Building



Felt Products' new plant addition at Carroll Ave. and Fulton Street, Chicago.

In commenting on this expansion, Mr. Byron J. Schwinn, Manager of Felt's Industrial and Automotive Division, states, "We believe this modern building is ideally located and laid out for our type of production and provides ample room for the expansion which we are anticipat-ing will be necessary in the post-war period in connection with new Felt Products developents in both the industrial and automotive felds. It marks another step in the continuous growth Felt Products Mfg. Company has shown

#### White Star to Aircraft **Accessories Corporation**

AIRCRAFT Accessories Corporation has again en honored by the War Department for outanding achievement in war production. The mpany's Power Controls Division at Burank, California, one of America's largest proncers of hydraulic controls for aircraft, has en awarded the white star, for continued eritorious services on the production front.

The star represents a renewal of the Army-Navy production award received in March, 1948, and will be added to the Army-Navy "E" ag which symbolized that award. In advising the company of the new award, Robert P. Paterson, Under Secretary of War, stated: "You have continued to maintain the high standard that you set for yourselves and which won you distinction more than six months ago."

The Electronics Division of Aircraft Accessories orporation, in Kansas City, Kansas, also flies Army-Navy "E" flag, for outstanding chievement in the production of communicans equipment for the armed services.

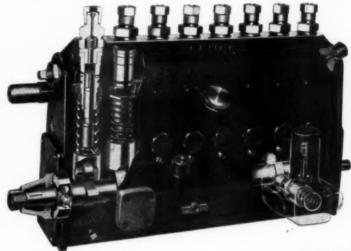
# WHEN AND WHERE SERVICE TIME IS AT A PREMIUM

Demco multiple-unit pumps

Pump elements are removable upwards without necessity of removing any other part of the pump.

pay big dividends

Largest plunger 12mm. diameter.



Available with from 3 to 8 pumping unit ossemblies.

Interchangeable with other makes.

> Servicing of the injection equip-ment in the field is greatly facilitated by the simplicity of the Demco Type "PB" Multiple-unit In-line

Pump. The plunger and barrel (pumping unit) may be removed from the pump housing (upward) without necessity of removing the camshaft and tappets, as illustrated in the cut-away view above. A new plunger and barrelassembly can be installed in the housing without requiring recalibration. These pumps are manufactured to exceptionally close tolerances and all external, or installation dimensions such as base, camshaft height, control rack location and movement, pipe connections, etc., conform to standard. Write for complete information on this and the complete line of Demco Pumps, Nozzles and Nozzle Holders

DIESEL ENGINEERING & MANUFACTURING CORP. 200-214 NORTH LAFLIN STREET . CHICAGO, ILLINOIS

OGRESS ne 1944

#### Army-Navy "E" To Buda

THE Buda Company, which has been involved almost 100% in the war effort for the last four years in the production of Diesel and gasoline engines, generator sets, fire pumps, lifting jacks and various railroad equipment for the U. S. Army and Navy, was awarded the Army-Navy "E" flag for excellence in production. The ceremony was held on April 27, 1944. It was attended by over 5,000 people including employees and guests. Colonel Luke W. Finlay, Executive to Chief of Transportation Corps, Washington, D. C., was the principal speaker;

and the "E" flag was accepted by Mr. J. S. Dempesy, president of the company. Lt. Commander Carl C. Stockholm, Commanding Officer, Shore Patrol, Ninth Naval District, presented the "E" pins to the five representative employees who were elected by impartial ballot.

One of the outstanding points of interest of the "E" ceremony was a product exhibit of from 20 to 30 representative products, including various types of Diesel and gasoline engines, generator sets, fire pumps, lifting jacks, industrial shop trucks, earth drills and railroad equipment, which are supplied the various branches of the Armed Forces.

#### Allis-Chalmers Announces New Gas-Turbine Division Headed By Dr. Rettaliata

CREATION of a new Allis-Chalmers research and Gas-turbine development division has recently been announced by R. C. Allen, manager of the company's steam turbine department. Dr. J. T. Rettaliata has been appointed manager of the new division.

While all Allis-Chalmers steam turbine design and engineering research activities will be conducted by the new division, the role it is in play in development of the much-talked-about Gas-turbine is perhaps most significant. Having built nearly 30 gas turbine units for oil refineries, Allis-Chalmers has operating experience on more prime mover types of gas turbines than any other American company. Their operating data added to experience Allis-Chalmers is getting in production of the aircraft supercharger version of the Gas-turbine is providing the broadest possible background for development work on this prime mover of the future.



Dr. J. T. Rettaliata

In directing this work, Dr. Rettaliata is applying an equally broad personal background. His work, which has been largely in the development of the Gas-turbine, has earned for him annual awards from national engineering and scientific societies for the past three years. Many engineering groups throughout industry have been hearing his interpretations of Gas-turbine development and significance. He received his degree of doctor of engineering at John Hopkins university in 1936. As chief engineer in Gas-turbine development, J. L. Ray will assist Dr. Rettaliata.

ANOTHER EXAMPLE OF YOUNG ENGINEERING SERVICE

## **HEAT EXCHANGERS**

Developed for

## MARINE FIRE FIGHTERS



★ Specially designed Young Heat Exchangers with large surge compartment employed on Buda Diesel-driven Fire Pumps, maintain both the lube oil and engine jacket water at temperatures suitable to efficient engine operation. They are constructed of corrosion resisting materials for salt water use and are equipped with zinc pencils for protection against electrolytic action. They are compact, efficient, have removable tube nests, and are easy to service. So varied and extensive is the production of Young Heat Transfer Equipment that one of the many specially designed units may meet your everyday needs. If not, Young engineers can quickly and economically apply their wide experience to special installations for wartime or industrial uses. Write —

YOUNG RADIATOR CO., Dept. 234F RACINE, WIS., U.S.A.

Distributors: The Happy Co., Tulsa, Oklahoma A. R. Flournoy, Bell (Los Angeles), California - Wrightson-Campion, New York, N. Y. - W. P. Nevins Co., Chicago, Ili, Calmes Engineering Co., New Oricans, La. - C. H. Bull, San Francisco, California. Expart: Ameresco, Inc. New York, N. Y.



HEAT TRANSFER ENGINEERS

Manufacturers of Oil Coolers - Gas, Gasoline, Diesel Engine Cooling Radiators - Intercoolers - Heat Exchangers - Engine Jacket Water Coolers - Unit Heaters - Convectors - Condensers - Evaporators - Air Conditioning Units - Heating Coils - Cooling Coils - and a Complete Line of Aircraft Heat Transfer Equipment.

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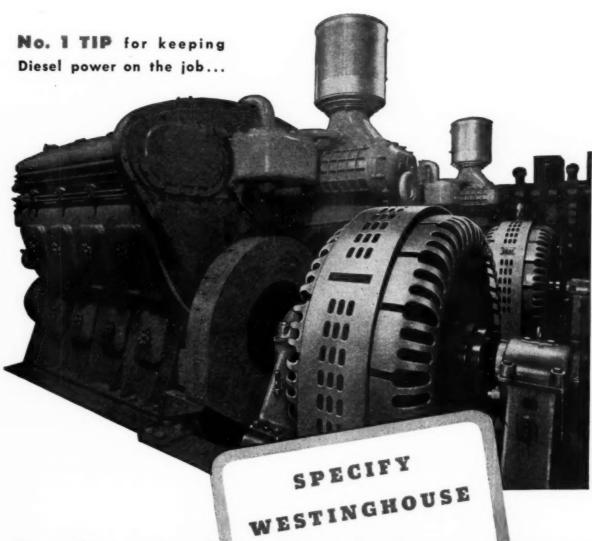
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for the complete electrical equipment



Westinghouse
PLANTS IN 25 CITIES ... O OFFICES EVERYWHERE

A-C GENERATORS FOR DIESEL ENGINE DRIVES

Split responsibility for electrical equipment means delays...lost time...confusion... both in ordering and installation, and when servicing or maintenance is necessary. Westinghouse offers three-way help in getting Diesel-generated power on the job—and keeping it there:

One Responsible Source—Westinghouse supplies the complete electrical equipment required for the installation—generators, exciters, voltage regulators, switchboards, circuit breakers, transformers, auxiliary equipment and controls. Time is saved in negotiation...full responsibility for electrical co-ordination is assumed by Westinghouse engineers.

Matched Equipment—Westinghouse generators are built to match the characteristics of the Diesel engines you purchase, regardless of make.

24-Hour-Per-Day Service—Thirty-three strategically located Westinghouse service shops provide round-the-clock service for all your electrical equipment.

For more information, call your nearest Westinghouse office or write for B-3028, "A-C Generators for Diesel Engine Drives." Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

J-10263

#### Mack Gets Ninth War Production Citation

THE awarding of second Star additions to the "E" flags of the three Mack Trucks, Inc. plants, brought the firm's wartime production awards to nine Army and Navy citations within the past year and a half. The awards were made at brief ceremonies recently in the Plainfield and New Brunswick, N. J., and Allentown, Pa., plants.

This third triple award allows Mack to con-

tinue as one of the few multi-plant manufacturers flying the "E" flag with subsequent additions of one Star and now the second Star.

#### Fairbanks, Morse Opens Tulsa Office

FAIRBANKS, Morse & Company announces the opening of a new office on April 10, 1944, in Tulsa, Oklahoma. The office is under the management of Frank D. Ratcliffe, District Manager, Oil Industry Sales, and is located at 1335 Hunt Building.

#### J. B. O'Connor Elected Executive Vice President, Dresser Manufacturing Company

M. M. MALLON, President of the Dreser Manufacturing Company, today announced election of three vice presidents of the company following a recent meeting of the Board of Directors. J. B. O'Connor has been elected Executive Vice President. Arthur R. Weis and Lyle C. Harvey have been elected Vice Presidents.



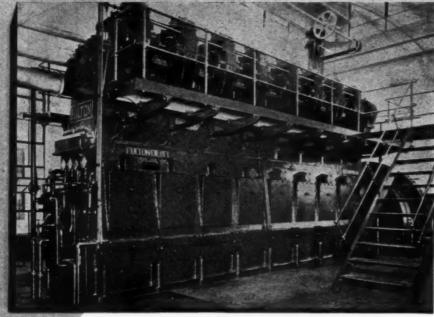
J. B. O'Connor

Mr. O'Connor has been a Director of Dresser Manufacturing Company since August 23, 1938. He is also Vice President and General Sales Manager of Clark Brothers; Chairman of the Board of the Pacific Pump Works; and Presidept of Bovaird and Seyfang, all subsidiarie of Dresser Manufacturing Company.

A native of Augusta, Georgia, Mr. O'Connor attended the University of Georgia and served in the United States Army in the first World War. In 1919, he joined the Prairie Oil Company, and in 1923 became Sales Manager of the Socony Vacuum Oil Company. He joined Clark Brothers in 1927 as General Sales Manager and became a Vice President in 1935. Mr. O'Connor is also a Director of the Gulf Plains Corporation of Corpus Christi, Texas. He is a member of the Veterans of Foreign Wars.

Mr. Weis is President of the Pacific Pump Works of Huntington Park, California, a Dreser subsidiary. Mr. Harvey is President of the Bryant Heater Company of Cleveland, also a subsidiary. C. P. Clark, President of Clark Brothers, who is already a Vice President of Dresser Manufacturing Company will continue to serve in that capacity.





Ninety-two years is a long time — yes, not far from a century of Engine Building Experience — to back up the Fulton Diesels we shall build for the peace-time World. In better than nine decades we have learned how to design and build Diesels for long, carefree, dependable and profitable service — with nothing left to guess work. These characteristic qualities of Fulton Diesels have been demonstrated in practically every type of stationary application — continuously for many years.

625 H.P. to 2000 H.P.

FULTON IRON WORKS CO.

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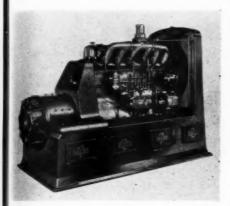
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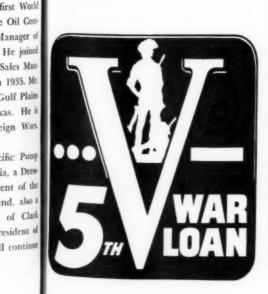
Bardeo Announces New Compact Generating Set

A NEW generating set of compact design has been developed by Bardco Manufacturing & Sales Company, for the Armed Services and other applications. The new unit has a capacity of 50 or 60 kw., DC, with voltage of 230. It is driven by a 6-cylinder Waukesha-Hesselman engine equipped with radiator and fan ooling, push-button electric starting and air, fuel, and lubricating oil filters.



new Bardco generating unit powered with a Waukesha-Hesselman engine.

The compact design of the generator results om the use of glass and mica insulation roughout. Ventilation is provided by conrolled air circulation through the shaft and field coils. The front head is accurately machined and generator bolted to flywheel housng to provide for permanent alignment. The rmature is coupled to the engine by means of a special Bardco high torque coupling, the driving half of which is provided with a ball bearing which takes the weight of the forward





For variable speed applications such as Diesel-powered vehicles and motor ships, the automatic timing feature in the Ex-Cell-O type KB fuel injection pump provides for maximum power output and minimum fuel consumption by advancing fuel injection timing according to engine speed. Speed-responsive timing materially results in smooth, flexible operation throughout the operating range and increases the service life of vital engine parts. For applications not requiring automatic timing, the Ex-Cell-O type KD pump provides the same high degree of dependability and efficiency. Both of these war-proved pumps reflect Ex-Cell-O's quarter century of precision production and years of experience in the Diesel field.

The Ex-Cell-O nozzle is a worthy complement to Ex-Cell-O pumps, specifically designed for efficiency, dependability and trouble-free service.

For complete information, engine builders should address Diesel Division, Ex-Cell-O Corporation, Detroit 6, Michigan.



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#### **Open Product Engineering Service**

H. G. MUELLER and Associates have announced the opening of offices in Eric. Pa., to provide a new engineering service to manufacturers for product engineering including: new ideas and designs, improvement of present products, engineering on Government contracts, research and inventions, drafting and shop drawing service, investigations, trouble analysis, test reports and sales.

Mr. Mucher for many years was connected with the engineering department of Skinner Engine Company, of Eric, and more recently with Ajax Iron Works, of Corry, Pa.

Offices will be located at 649 Hilltop Road, Eric.

#### Perfect Circle Announces Several Changes In Executive Personnel

▲ NUMBER of organizational changes became effective April 1, according to Lothair Tector,

President of The Perfect Circle Company.

W. Herschell Skinner, former Purchasing Agent of the Richmond Plant, has been appointed Assistant Purchasing Agent of The Perfect Circle Company, with offices at Hagerstown. Robert Van Winkle succeeds Mr. Skinner as Purchasing Agent of the Richmond Plant.

Mr. Tector also announced that Stanley Murray has been made Manager of the Warchouse of the Hagerstown Plant. Mr. Murray formerly was Assistant Advertising Manager and for the last several months has been in charge of the Priorities Department.

#### Maritime Commission Orders 74 Hendy Diesel-Generating Plants

GREEN light for the immediate production of a large number of new type Diesel-generating plants has been given the Joshua Hendy Iron Works by the Maritime Commission, according to a recent announcement by Chas. E. Moore, president of the firm. The units are scheduled off the production line at the rate of twenty-two per month by the end of the year.

To develop 250 kilowatts each, these plans consist of Series 50 Hendy Diesel engines and Crocker-Wheeler direct-current generators, mounted on bed-plates. These units are for use on the AV-1 type of Maritime Commission ships, and will provide the electric current for general ship-board services. Engines to drive the generators are six-cylinder units, with a bore of 12" and a stroke of 15". Among the features of the engines are the dual intake and exhaust valves, unit type fuel injectors, and welded-steel construction of the bed-plate, cylinder block and crankcase.

In addition to the Hendy Diesel engines and Crocker-Wheeler generators ordered by the Maritime Commission, the Pomona Pump Division of the firm has also been awarded substantial contracts for a wide variety of pumps to be installed on the AV-1 class of vessels.

#### 1943 Editorial Index Now Available

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## SAFEGUARDING THE ENGINES OF THE LST's



Nothing is more disastrous than engine trouble on invasion craft. Hence the strictness of military authorities in engine specification and design—and in the filters built to keep dirt and other abrasives out of the lubrication systems.

Cooperating with engine builders and adhering to rigid specifications, MICHIANA has applied its many years of experience to the task of supplying the Oil Filters required to meet War demands. All over the world, MICHIANA Oil Filters and spare replacement Filter Elements are protecting the engines of military ships and equipment, to provide longer and more satisfactory service... They are made for use with Diesel and gasoline engines of all capacities.

The illustrations show new Navy Specification MICH-IANA Oil Filter and one of the identical Filter Elements

used singly and in sets of 2, 3, 4, 6 and 8. These filters are made in capacities from 100 HP. to 2000 HP. MICHIANA PRODUCTS CORPORATION, Michigan City, Indiana.



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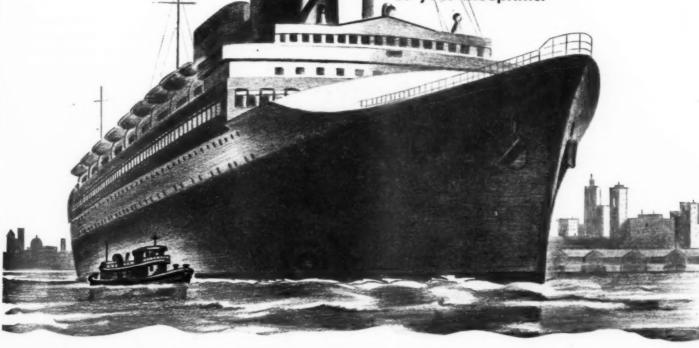
# Parts built for Toil and Sweat

McQUAY-NORRIS

ALTINIZED

PISTON RINGS

Diesel engines have tough work to do.. and tough work demands tough precision parts. That's why, on every Diesel front, you'll find McQuay-Norris parts making an outstanding record for efficient, dependable, economical performance. Every McQuay-Norris part is backed by 34 years' experience in precision manufacture. Send us your blueprints.





Awarded to two plants McQuay-Norris Ord.

# McQUAY-NORRIS

MANUFACTURING COMPANY
St. Louis, Mo.



PRECISION WORKERS IN IRON, STEEL, ALUMINUM, BRONZE, MAGNESIUM

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should be encouraged as every shortcut adds materially to the lessening of outage periods and the hastening of maintenance jobs. And we must realize that even the novice ofttimes has ideas which will be well for us to consider since many an idea has been found to have merit, even though it has come from a source not too familiar with the equipment.

#### **G.I. Diesel-Electric Locomotive**

▲ GENERAL Electric 25-ton Diesel-electric is

the only locomotive at the Mitchell Field Army Air Base in Long Island. The field's "Toonerville Trolley" replaces a gasoline operated locomotive. It operates over a track only .7 of a mile long, but it hauls over a million pounds of inbound and outbound freight daily.

The locomotive has a two-man crew. The permanent engineer, shown in the cab, is Sgt. Elwood P. Lauer of Port Jervis, N. Y. The sergeant's job is to see that the freight cars of the Long Island railroad are unloaded and

The Army's G.I. Diesel-electric locomotive at Mitchell Field, Long Island, with Sgt. Elwood Lauer at the controls.

moved as fast as possible along the short track. The 25-tonner, one of the five standard-size G-E locomotives operated by the Army, has a pulling power of 15,000 pounds and its top speed is 20 miles per hour.

# Diesel Dragger Leads Fishing Fleet to All-Time Record Production

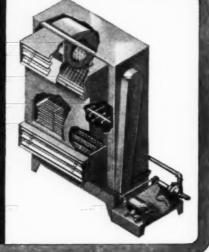
SETTING a new all-time peak with 170,092, 000 pounds of fresh fish which grossed 12 million dollars, the fishing industry at Gloucester, Mass., broke all previous yearly production records during 1943, according to figures recently received by The Cooper-Bessemer Corporation. One vessel, which figured prominently in Gloucester's notable accomplishment during the past year, was the dragger, Columbia, which gross stocked the unprecedented total of \$342,419.50 since her maiden trip on January 14, 1943.



The Cooper-Bessemer Diesel engined "Columrecord-breaking fresh fish producer for the year 1943.

With haddock, cod and redfish comprising the bulk of her production, the Columbia's crew received \$16,513 each for the year's hauls. Pro-

WATER SUPPLY for Diesels No Problem with FAIRBANKS-MORSE **Evaporative Coolers** 



FAIRBANKS MORSE Evaporative Coolers are designed to cool the jacket water or lubricating oil of Diesel or gas engines in a closed system. They assure you of fewer shutdowns—less repairs—longer life-more economical over-all performance and protection for your power equipment

Fairbanks-Morse Evaporative Coolers use less water -actually only 5% of the amount generally required for a continuous water supply. They offer a distinct advantage in reduced operating expense where the high cost or scarcity of water is a problem.

Fairbanks-Morse Evaporative Coolers are manufactured in a number of models.

For further information write Fairbanks, Morse & Co., 219 Fairbanks-Morse Building, Chicago 5, Ill.

#### Type "C" Fully Automatic F-M Evaporative Cooler

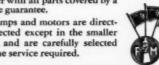
Illustration shows cut-away view of this model. Automatic dampers are built into the air intake, discharge, and by-pass. When cooler is in operation and jacket water temperature of engine up to desired point, by-pass dampers begin to close and inlet and outlet dampers to open. During operation these dampers fluctu-ate to keep engine water at the desired temperature. For cooling lubricating oil, this unit is available with separate coil in the same cooler with jacket water coil.



#### Fairbanks-Morse Pumps and Motors

The use of Fairbanks-Morse pumps and motors on all units assures a complete evaporative cooler with all parts covered by a single guarantee.

Pumps and motors are directconnected except in the smaller sizes, and are carefully selected for the service required.



# S-MORS

DIESEL ENGINES PUMPS MOTORS GENERATORS

WATER SYSTEMS SCALES STOKERS FARM EQUIPMENT RAILROAD EQUIPMENT



Diesel Engine Cooling Equipment

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In Nove Hendy o several m pulsion for this 93.3-foot vessel with 23.4-foot beam is supplied by an 8-cylinder direct-reversing Cooper-Bessemer Diesel rated 350 horse-power at 350 revolutions per minute. She was designed by Eldredge-McInnis, Inc., and built at the Lyman-James Yard, Essex, Mass. According to all records available, the *Columbia*, which has a capacity of 180,000 pounds, stocked \$54,000 on her first 4 trips and has set an all time single record of \$22,000 stocked during a seven day period.

#### Wallace Johnson Appointed Hendy General Sales Manager

WALLACE JOHNSON was recently appointed general sales manager of the Joshua Hendy Iron Works at Sunnyvale, California, according to an announcement from Charles E. Moore, president of Hendy, with whom Johnson has been associated for a number of years.

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With an engineering as well as a sales background, Mr. Johnson comes to his new post well qualified to direct the sales of this largest western manufacturer of prime movers. He is a graduate of California Institute of Technology in mechanical engineering.

His first association with Mr. Moore was as sales engineer for the Moore Machinery Company. Later he moved to another Moore interest, the Autometric Machine Tool Company, where he served as sales manager and chief engineer.



Wallace Johnson

In November 1942, Mr. Johnson joined the Hendy organization. His work has included several months at the Crocker-Wheeler Division

# DON'T GET CAUGHT with your PUMPS down

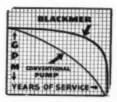


Standardize on BLACKMER ROTARIES

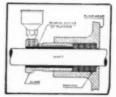
When the "buckets" (swinging vanes) finally wear out, this simple replacement restores a Blackmer pump to normal capacity. It's a 20-minute job.



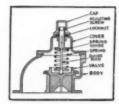
The curve shows the sustained capacity of Blackmer pumps. 20 years of service is not unusual. Compare this with a conventional type rotary pump.



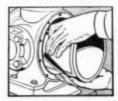
Double bearings eliminate shaft-whip and provide exceptional rigidity. The bearings are located outside the pump casing, away from the pumpage, protected by packing.



Built-in relief valve will by-pass the entire capacity of the pump without shock or end-thrust. This gives positive protection to the pump. Valve operation is quiet—no chatter.



For tough jobs, handling corrosive or mildly abrasive liquids, Blackmer pumps are furnished with removable liners. When finally worn out, the liner is replaced and the pump restored to normal capacity. This saves cost of a new pump.



Dependable Pumps for Diesel Fuel & Lube Oil Service.

POWER PUMPS 1 to 750 GPM. Pressures to 300 psi.

HAND PUMPS

11/2 to 25 GPM. Pressures to 125 psi. 56 models

Write for new Bulletin No. 304—Facts about Rotary Pumps BLACKMER PUMP COMPANY, 1966 Century Avenue, Grand Rapids 9, Mich.



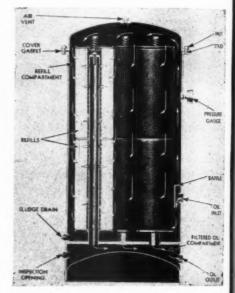
at Ampere, New Jersey, in the capacity of assistant to Mr. Moore; several months as an administrative head at Sunnyvale; and since June 1948 until his current appointment, he has been assistant general manager of the Pomona Pump Division at Pomona, California.

Morris Levit is head of sales for the Joshua Hendy division, with C. L. Barrett as sales manager at Pomona division and L. T. Warner at Crocker-Wheeler division.

#### Briggs Clarifier Announces New Diesel Fuel Filter

BRIGGS Clarifier Company announces an improved standard line of round tank fuel oil filters for Diesel engines. New models have been added to broaden the application of Briggs Fuel Oil Clarifiers so that flow capacities range up to 500 gph.

Maximum working pressures and hydrostatic test pressures have been established to meet specific demands of the application. For small high speed Diesel engines where pressures sometimes run well above 50 p.s.i., the Clarifier is designed for a maximum working pressure of 100 p.s.i. and is hydrostatically tested at 150 p.s.i. For large, heavy-duty Diesels where pressure is usually between 15 and 25 lbs., the Clarifier is designed for a maximum working pressure of 40 p.s.i. and hydrostatically tested at 60 p.s.i. Pressure drop across the refills ranges from 0 to 5 p.s.i. on all models.



Sectional view of Briggs Diesel fuel filter with principal parts identified.

Manufacture of these standard units has been worked out in every detail and assembly took designed to assure a uniform finished product. Covers and cover gaskets will be interchangeable in the various sizes . . . spare gaskets may be ordered with bolt holes already punched. Gaskets are made of improved "Corprene."

Provision is made for registering pressure differential across the refill cartridges by installing one gauge in the upper compartment of the tank and another in the lower compartment. A glance tells the operator the exact pressure differential and when to change refills, Improvements have been made in the refill holding assembly to assure a perfect seal at both ends of the refill cartridge.

#### 1943 Editorial Index Now Available

A COMPLETE index of all articles and editorial material with a cross index of author which appeared in the 1943 issues of DIESEL PROGRESS is now available. Copies of this ten-page index will be mailed upon request without charge. Write direct to DIESEL PROGRESS, 2 West 45th Street, New York 19, N. Y. for your copy.

# DIESELS ON TOMORROW'S VAST NEW FRONTIERS

Along the shipping lanes of the world . . .

In the Texas oil fields . . .

In a South American light plant . . .

On a North Dakota farm . . .

Wherever you go in tomorrow's peacetime world you will find Diesels at work serving man and serving him well.

Diesels proved themselves to many individual users of power long before September 1939.

But it took a war to make their efficient, low-cost, dependable operation known to the world at large.

And now that the world has seen what Diesels can do, an almost limitless application of Diesel power looms before us.

VORTEX Spark Arrestors, Silencers and Spark Arrester Silencers have contributed much toward helping entrench Diesels so favorably in the public mind.

It is only natural that these VORTEX engine auxiliaries — to-day being produced only for war—should play an important part with Diesel power in developing the new, far-flung frontiers of a world at peace.

ENGINEERING SPECIALTIES CO., INC.
39 Cortlandt Street . New York 7, N. Y.



# VORTEX

SPARK ARRESTERS . SILENGERS . SPARK ARRESTER SILENGERS

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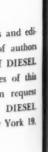
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CAMPBELL, WYANT & CANNON

Six foundries in four cities:

Muskegon-Henry Street Plant Sanford Street Plant C.W.C. Crankshaft Corporation.

South Haven-National Motor Castings Co. Lansing - Centrifugal Fusing Co. Bettendorf, Ia. - Ordnance Steel Foundry Co.

INDUSTRY'S LEADING CONTRACT **FOUNDRY ORGANIZATION** 

AND LINERS SOLVE THE PROBLEM

C.W.C. cylinder liners and acid-proof inserts, centrifugally cast of electric furnace alloyed metal, provide the real solution to engine wear due to corrosion. Widely used in heavy duty engines, C.W.C. inserts and liners are now available to engine builders in every field.

The C.W.C. centrifugal casting process results in uniform density and structure of metal with high Brinell and excellent machinability. Greatly reduced scrap ratio eliminates wasted production time. Without further aging or heat-treating, C.W.C. cylinder liners and inserts are free from distortion and out-of-roundness. Exact metallurgical control of C.W.C. electric furnace metal produces a product remarkably free from wear.

Write C.W.C. for complete information. Experienced C.W.C. engineers and metallurgists offer their counsel to all interested executives regarding the prevention of cylinder wear and corrosion, or concerning any volume casting problem.

CAMPBELL, WYANT & CANNON FOUNDRY CO. MUSKEGON, MICHIGAN

# TO MEET MOST PRODUCTION SCHEDULES



At WESTON, production finally has outstripped the overwhelming war demand for panel and other instruments . . . making WESTONS again obtainable on a basis to meet most war production schedules.

To experienced instrument users, this means they again can obtain the instruments whose design and manufacture incorporate the broadest instrument experience in surmounting the requirements of exacting applications. The instruments whose consistent, uniform performance simplifies their problems of inspection, handling and other burdensome procedure . . . and whose dependable, long-term accuracy assures better operating performance from the devices into which they're built.

Why not discuss your instrument schedules with WESTON, today . . . and be sure of obtaining the added product efficiency which authentic WESTONS provide.

- Panel & Switchboard Instruments (DC, AC, and Thermo)
- Precision DC and AC Portables
- Instrument Transformers
- Specialized Test equipment
- Laboratory Standards
- · Sensitive Relays
- Light Measurement Instruments
- Aircraft Instruments
- Electric Tachometers
- Dial Thermometers

Weston Electrical Instrument Corporation 618 Frelinghuysen Avenue, Newark 5, N. J.

FOR OVER 55 YEARS LEADERS IN ELECTRICAL MEASURING INSTRUMENTS

#### McCulloch Engineering Appoints Eugene W. Wasielewski

MCCULLOCH Engineering Corp., a "Borg Warner Industry," is continuing to build up a strong engineering staff for their Superchargen as evidenced by their announcement of the appointment of Eugene W. Wasielewski at Chief Engineer.



Eugene W. Wasielewski, chief engineer, McCulloch Engineering Corp.

Mr. Wasielewski took his Master's degree in engineering mechanics at the University of Michigan. After a few years of practical field work with turbines, blowers, and internal combustion engines, he was attracted to the new and rapidly developing field of Supercharging.

When the war came, giving a tremendous impetus to supercharging for high altitude flying he had already behind him four years of work with the National Advisory Committee for Aeronautics on design of superchargers and their adaptation to airplane engines.

Since 1941, Mr. Wasielewski has aided subsidiary companies of Fairchild Engine & Airplane Corp. to develop superchargers as Supercharger Project Engineer for Ranger Aircraft Engines Division and as Executive Engineer of Stratos Corp. He will direct the engineering work at McCulloch in the further development and application of superchargers to Diesel and gasoline engines for land and marine users.

#### New Booklet Tells How Large Springs Are Coiled

A NEW 8 x 11½ folder illustrates and & scribes how large springs are hot-coiled. It is just been published by the Muehlhausen Spring

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Corporation, Logansport, Indiana. Described as the first of its kind, the new booklet shows facilities necessary and operations required to fabricate these springs in quantity and yet hold to the tolerances demanded by the application of the spring.

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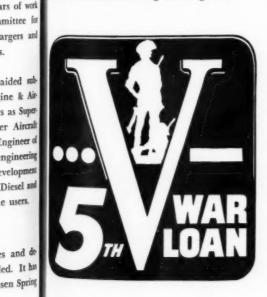
tude flying.

e users.



This booklet describes how springs up to 21/2 in. bar diameter are coiled.

The booklet represents a quick trip through the ot-coiling plant of the Muehlhausen Spring Corporation, one of the largest in the world levoted exclusively to hot-forming springs, and high-lights the extensive equipment that enables this company to produce the exact type nd size spring to meet any application and in the desired quantities required to fit in with roduction schedules. Your copies may be had by writing directly to the Muehlhausen Spring Corporation, 1943 Michigan Avenue, Logansport, Indiana, mentioning this magazine.





lune 1944 OGRESS

# Gnawing on a hillside

#### ... means continual load variation on the Diesel power-unit

• Whether the shovel chips and bucks its way along in loosening tough, rocky earth—or swings rhythmically through load and drift in "easy going"—the Pierce Governor keeps the speed constant, the power efficiently controlled to the need.

For the operator, it is better than a human hand at the throttle control. Pierce Flyball Governors compensate instantly for every change in load. Action is mechanically positive—dependable through maximum trouble-free service life.

Pierce Flyball Governors for Diesel engines are available in two types—to drive independently of the fuel pump, or directly from the fuel pump shaft. Pierce engineers, with a wide background of experience, are always ready to offer assistance in governing problems.

THE PIERCE GOVERNOR COMPANY, INC. • 1603 OHIO AVENUE • ANDERSON, INDIANA

Manufacturers of Pierce Precision Governors and Sisson Automatic Chokes

Canadian Manufacturer and Distributor: BURLEC LIMITED, Toronto 13, Canada



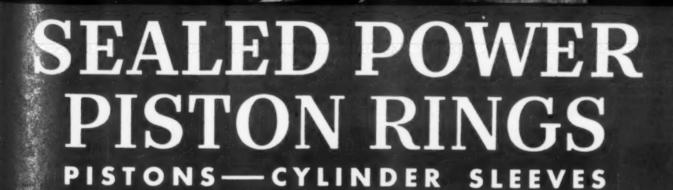
Over 30 Years' Preference by
Major Engine Builders Has Established
SEALED POWER SUPERIORITY

Sealed Power leadership has been won through more than 30 years of improvement. Superior laboratory and manufacturing facilities, scientific engineering and skilled craftsmanship, have made Sealed Power products the choice of major engine builders during all that time.

You are invited to use the experience of our engineers, the unequalled facilities of our laboratories, to help make your good Diesel engines even better.

SEALED POWER CORPORATION Muskegon, Michigan • Windsor, Ontario

\* BUY MORE WAR BONDS



#### The Navy Needs **Engineer Officers**

THE Navy has need for men qualified to serve as officers in connection with the servicing, maintenance and repair of internal combustion engines in operating vessels in advanced areas. Applicants having an engineering degree from an accredited college must have at least five years of experience in the field of machinery manufacturing, installation or service. Such experience must be with steam turbines, internal combustion engines, reciprocating steam

engines or electrical machinery, both AC and DC. In the absence of a degree, applicants must have at least ten years of experience, and have had responsible charge of work in the field of machinery manufacturing, installation or service of the types mentioned above. Applicants, who by virtue of their experience are thoroughly familiar with machinery actually in use in the U.S. Navy will be given preference over applicants without such experience. Age bracket, twenty-four to fifty. Applicants must meet Naval physical requirements and possess

officer-like qualities. Applications should b made at the Office of Naval Officer Procure ment, 33 Pine Street, New York 5, N. Y., or to other procurement offices located in principal cities throughout the United States.

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#### "Something Fundamentally New . . " A New Booklet by Van der Horst

66A truck driven over 100,000 miles, yet have ing a cylinder wear of only .002 in. . . . marine Diesel operated more than 30,000 hour before needing an overhaul because of cylinder wear . . . A power plant operating at full load for 14,000 hours without measurable cylin der wear . . . " These are the opening state ments of a new booklet published by Van de Horst Corporation, describing the method and advantages of Porus-Krome treatment of Die sel engine wearing parts as protection agains corrosion and abrasion. Illustrated and easy to read, this new booklet tells the story of the Porus-Krome process and its inventor, Hendrik Van der Horst. Get a copy by writing on your letterhead to Van der Horst Corporation of America, Olean, New York or Cleveland II

#### **Bayles Discusses Diesels** for Aviation Before S.A.E.

N February 3rd 1944, forty department head and other employees of the Rogers Diesel and Aircraft Corporation joined in honoring Allison L. Bayles, Director of Research and Develop ment for that corporation, who discussed Diese engines for aviation before the Society of Auto motive Engineers.



Allison L. Bayles

in discussing the practicality of Diesels for age

# "CHICAGO SCREW" -- the Outfit with the Know How!



When precision is important—remember "Chicago Screw", the outfit with the "Know How". Working to close tolerances is easy with us, because we have the experience, manpower and machinery, plus the "know how" to produce hundreds or millions of hardened and ground

screw machine products for Diesel use -all to exacting precision standards. All secondary operations such as Slotting, Milling, Drilling, Broaching, Hardening, Grinding, Thread Grinding, Thread Milling, etc. are handled within

our own plant.

## THE CHICAGO SCREW CO.

1026 SO. HOMAN AVENUE

CHICAGO, ILL



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autical use, Mr. Bayles pointed out the charceristics which airline engineers agree unaniously that airplanes and their power plants N. Y., or to nust have—then showed how, with the excep-n principal on of the weight factor, the compression ignion engine has already demonstrated its ability meet these requirements.

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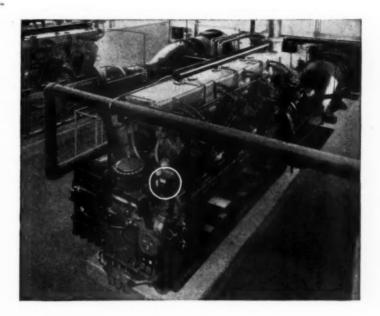
on the subject of weight he offered two possible lutions-1) A merger of the Otto cycle and e compression ignition cycle, taking the best practeristics of each. The advent of jet prodsion may aid materially in capitalizing on ch a merger. 2) A compression ignition engine parting from the conventional design. Here f. Bayles said, "If a compression ignition enne is heavy let us remove the causes that make 10. Let us reduce parasitic force such as side trust of the piston. Let us reduce centrifugal adings. Let us make pistons cooperate. Let put tendency to wear where it can be lubrined properly. Let us have a constant relation-ip between rotational elements and the firing. et us fire cylinders once per revolution. Let us cognize the masses of air and combustion gases nd treat them intelligently. Let us have a ing order where 1-2-3-4, means 1-2-3-4. In ort, let us have an engine which runs in

#### akite Conference Results vailable to Diesel Engineers

ussed Diese CONCURRENTLY held in New York, Chigo and Los Angeles were the Oakite Third ar Production Conferences on cleaning, deling, de-rusting, de-greasing and related proction and maintenance operations. Particiting with the entire Field Technical Service presentatives were the staffs of the Mechani-I Engineering, Chemical and Research Labalories and General Headquarters of Oakite roducts, Inc.

> htse two-day sessions were devoted to the lating of field experience in order to deterine the best and most practical methods for pping up wartime production through edier cleaning, due consideration being en to the emergencies of manpower and thortage of time. Also discussed were arete, workable techniques for prolonging wipment life; improving plant sanitation and Menance; faster, more thorough cleaning repair and overhaul procedures.

> particular interest to Diesel Engineers and er executives responsible for the operation Diesel engines were the information and h exchanged by the Technical Service Repsentatives revealing newly-devised, safe



Continuous-running Cooper-Bessemer gas engines guarded by

## Alnor Exhaust Pyrometers

\* The entire water supply of a vast synthetic rubber plant is provided by this installation of two 800 hp. Cooper-Bessemer gas engines, operating day and night, without standby equipment. As in so many other instances of dependable heavy-duty operation, these engines are guarded by Alnor Exhaust Pyrometers. Checking exhaust temperatures with the Alnor Pyrometer is a reliable guide to efficient operation and accurate adjustment and maintenance. There is an Alnor Exhaust Pyrometer to meet the needs of any type of engine, large or small. The complete range of sizes and types includes single and multi-point pyrometers and portable types. Write for Bulletin 2819 with complete data.

#### ILLINOIS TESTING LABORATORIES, INC.

420 North La Salle Street Chicago IO, Illinois

ROGRESS e 1944

sels for acro

techniques for handling such maintenance tasks as de-scaling Diesel cooling systems; cleaning lube oil and jacket water coolers; degreasing parts before repair and overhaul; reconditioning air-intake filters; cleaning intercoolers of air compressors; cleaning air compressor valves. Cleaning waste heat boilers or water heaters.

Data and information resulting from the discussions held at the various meetings are

Does More Than Strain Oil... More Th

freely available to all through the medium of the Oakite Technical Field Service. Address Oakite Products, Inc., 22 Thames St., New York 6, N.Y.

#### **New Cycloidal Rotary Pump Bulletin**

ROOTS-CONNERSVILLE Blower Corp. has just issued Bulletin 61-B11, devoted to its cycloidal rotary pumps. This is a four page folder printed in two colors, with numerous illustra-

tions showing various driving arrangements, in. cluding direct coupled electric motors, gasoline and steam engines, in addition to standard arrangements such as flat belt or V-belt, gear reducers, etc.

A cross-sectional view shows the three-lobed im pellers which are used in both the type 'RF' and 'SO' pumps. Type 'RF' pumps are suit able for handling the heavier and more viscous liquids at heads up to 150 ft. while the type 'SO' pumps handle the same kinds of liquids at heads up to 120 ft., the latter being used for larger capacities.

It is claimed by the manufacturer that these pumps are suitable for handling tar, oil, grease, asphalt, slack wax, semi-pastes, spent grain, and many others, and that, due to the rotary principle, numerous moving parts are eliminated and there are no contact points between the impellers themselves or the impellers and the case. It is also claimed that liquids and gases can be handled simultaneously.

Pumps can be supplied in corrosion resisting metals and with steam jacketed cylinders a meet special requirements.

The back cover carries a group of typical installations to which Cycloidal pumps have been applied, and illustrates the various services for which these pumps are adapted. There is also a list of well known firms, in many and varied lines, who use these pumps.

#### **National Supply Elects** Albert T. Huizinga Vice President



Albert T. Huizinga

ELECTION of Albert T. Huizinga as vice an addition to president and treasurer is announced by the the infant ele National Supply Company, Pittsburgh. Mt. ing the practi



Huizinga joi 19, 1943, co Company, C asurer. P nery, Wa iness in (

Elliott Co M. E. TH er, invente nerator, d April 5th at e to a hea he active lis npany, N salting er e of his d gineer of t

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Huizinga joined the company as treasurer, July ements, in 19, 1943, coming from Montgomery, Ward & s, gasoline Company, Chicago, where he had been assistant andard ar. belt, gear reasurer. Prior to his association with Montmery, Ward, he had been in the banking siness in Chicago for twelve years.

#### type 'RF Elliott Company Pioneer Dies

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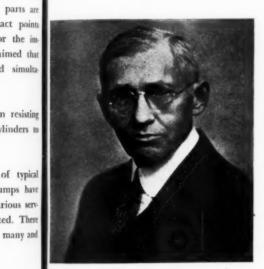
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M. E. THOMPSON, electrical industry pioneer, inventor, and father of the compensated enerator, died at his home in Ridgway, Pa., April 5th at the age of 80, after a long illness due to a heart condition. Oldest employee on the active list of the Ridgway Division, Elliott ompany, Mr. Thompson was employed as sulting engineer for Elliott Company at the ne of his death. He had previously been chief ngineer of the Ridgway plant.



M. E. Thompson

native of Greenfield, Ohio, Mr. Thompson, received his B.S. degree in electrical engineering at Cornell University in 1890, completing he four year course in three years. His postaduate work as assistant to Dr. Harris J. Ryan, professor of electrical engineering at Cornell and, later, at Leland-Stanford Univerity, led to tests on the first electrical generator quipped with compensating windings, designed by Dr. Ryan.

As a result of these tests, Mr. Thompson deigned, in 1893, the 10-kw., 110-volt, six-pole elled generator now displayed in the Edison stitute at Dearborn, Michigan. This Thompon Ryan machine carries a card reading "This the first generator ever built having compenaled winding and commutating poles."

n addition to discoveries which revolutionized he infant electrical power industry by increasing the practicability and commercial value of

direct current generators and motors, Mr. Thompson made many other contributions to the design of steam engines and other power plant equipment. As early as World War I, he was a pioneer in the development of electrical propulsion equipment for submarines of the U. S. Navy, and held the esteem and trust of many high-ranking officials of that service.

The Ridgway Division of Elliott Company was a major interest in Mr. Thompson's life. His training and assistance were of special value to

younger engineers, and his help in the problems of electrical design, and in the techniques of electrical and mechanical engineering, was of substantial aid in the development and growth of the company.

#### Fire Extinguisher **Operates Single Handed**

SPEED and maneuverability are all-important in combating the sudden "spot" fires that constantly menace machine shops, production lines, power houses. With these factors in mind,



FOR TANKS, PLANES and SHIPS

No Fire Hazard Lower Fuel Consumption **Increased Striking Range Greater Stamina** 

Dependable Operation Instant Response to the Throttle No Ignition System

Lower Cost of Fuel Constant Torque at All Speeds No Radio Interference



OGRESS Ine 1944

Randolph Laboratories, Inc., has produced a Carbon Dioxide fire extinguisher that requires only one hand in operation—from the moment the unit is grasped until the fire is out.

"Model FF-4," latest in Randolph's 4 lb. CO<sub>2</sub> series, features a self-aimed, fixed discharge horn, and a thumb-operated trigger valve that releases a penetrating blanket of Carbon Dioxide—a gas that smothers fires in an instant. The operator, as though aiming a .45 revolver, grasps the extinguisher's arched-steel handle,

while the thumb presses the trigger directly above. The fire-resistant horn, permanently regulated to fixed firing position, eliminates the necessity of making aiming adjustments. One hand is free for precautionary measures, and the chances of "operator's panic" are greatly reduced.

Additional information on Carbon Dioxide firefighting methods may be obtained from the manufacturer (8 E. Kinzie St., Chicago, Ill.) on written request.





Single-handed fire extinguisher which is aimed like a pistol.

#### Caterpillar Appoints Omaha Distributor

THE appointment of the Cliff Miller Machinery Co. as distributor for Omaha, Nebraska and surrounding territory has just been announced by Caterpillar Tractor Co. Headquarters for the new firm will be at Omaha with a store located at Sioux City, Iowa.



(Left to right): J. J. Valentine, Central Sale Mgr., Caterpillar Tractor Co.; G. E. Spain, Viat President, Caterpillar Tractor Co.; M. Let Coonan, Ass't Mgr., Cliff Miller Machinery Co. Clare Fintzell, Sales Manager, Cliff Miller Machinery Co.

Cliff Miller, who has been associated with the distribution of "Caterpillar" and allied equipment in this territory for over twenty year will become General Manager, and Assistant Manager will be M. Lee Coonan, who has been a district representative for LaPlant-Chour Mfg. Co. of Cedar Rapids, Iowa for a number of years. Sales Manager for the concern will be Clare Fintzell, who has had wide experience in the sale of this equipment in the territory for many years.

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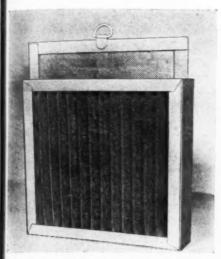
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J. Neil B New Eng Enterpri

#### Air-Maze Announces New oil Separator Filter

FIRE hazard, health hazard, and nuisances caused by oil thrown into the air during many types of industrial processes can often be eliminated through the use of a new oil separator filter developed by Air-Maze Corporation.



Air-Maze Type R-56B Oil Separator Panel.

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This new filter, properly installed in a ventilating system, removes oil, kerosene, etc., entrained in the air. It does not, however, remove oil smoke or liquids in a true vaporous state. The unit consists of a permanent, viscous impingement filter that effectively removes dirt and dust from the air, and a removable oil collecting media that traps the remaining liquid particles. This oil separator panel is known as the Type R-56B, and is available in standard

#### J. Neil Brophy Will Cover New England States for Enterprise



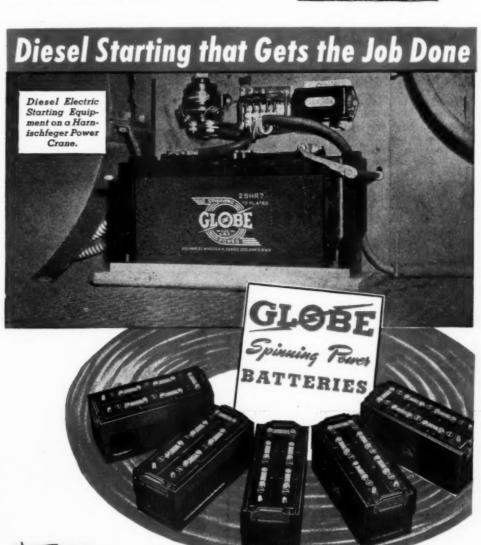
J. Neil Brophy

AFTER six weeks spent at the main offices and plants of Enterprise Engine and Foundry Company, San Francisco, J. Neil Brophy, will represent the Engine Division of Enterprise covering the New England States out of the company's New York Offices.

E. B. Scott, Sales Manager of Enterprise states, "In line with our policy to give the Atlantic seaboard the equivalent of 'factory service' we are constantly adding to our sales and service staff. Most recent appointment, is J. Neil

Brophy of Boston, formerly our New England Oil Burner Distributor. Mr. Brophy has just finished six weeks at our plant, to orient himself with modern Diesel production methods, and is well equipped to take his new post to give our customers the very best service."





Electric starting equipment, as simple as on your automobile, makes Diesel Starting easy. A touch of the starter button and you're ready to go. Powered with Globe

Spinning Power Batteries, with Perma-Set Plates, you have the efficiency, low operating costs, and dependability you associate with Diesel performance.

If you are looking ahead, call in a Globe engineer. Address nearest factory.

#### GLOBE-UNION INC., MILWAUKEE 1, WISCONSIN

ATLANTA . BOSTON . CINCINNATI . DALLAS . KANSAS CITY . LOS ANGELES MEMPHIS . MINNEAPOLIS . PHILADELPHIA . SEATTLE



#### CARBON DIOXIDE FIRE EXTINGUISHER

Foresighted safety engineers demand streamlined, mobile fire protection. And first in their line of defense is portable carbon dioxide. Randolph "4" . . . the modern extinguisher . . speeds fire-fighting—kills electric, machine, flammable liquid fires with quick, easy action. Just a touch of the trigger—and powerful carbon dioxide charges into the flames, smothers the blaze in a penetrating, icy blanket.

Randolph carbon dioxide is SAFE. It does not conduct electricity or damage equipment . . , will not deteriorate, and is effective in extreme temperatures. Approved and labeled by Underwriters' Laboratories, Inc.

Mobilize against fire with Randolph "4". For prompt delivery without priority, 'phone your supply house, or write us—today.



ONE-HAND ACTION Portable, lightweight, Randolph "4" is designed for one-hand, self-aimed operation. With no hoses to twist, valves to turn, horns to raise—this extinguisher is PANIC-PROOF.



RANDOLPH "2" Ready to combat sudden "flash" fires. This compact, small unit, with exclusive Randolph design, is especially adapted for bracketing in BUSES, TRUCKS, and MARINE CRAFT.

SEND NOW for new, free booklet "Sharpshooting at Flames." Illustrates latest techniques in carbon dioxide fire-fighting.

NAME .....

ADDRESS .....

RANDOLPH LABORATORIES INC

#### New Oil Reclaimer Is Automatic, Continuous

A NEW line of YM "Robot" Oil Refiners, designed to clean Lubricating Oil with continuous and automatic operation, has been announced by the Youngstown Miller Company.



The new YM "Robot" continuous oil refiner.

This machine, which is said to add new effi-

ciency, convenience and economy to the YM process of cleaning oil, utilizes common refinery earths available on the open market. It is capable of removing fuel dilution, acids, solid and colloidal carbon, dirt and similar matter; also, it can restore oil emulsified by water. When piston varnish and sludge deposits are present, the manufacturer offers a guarantee on removing them and preventing recurrence.

A single machine of this type can be installed to serve an entire power plant, whether large or small. Ability to restore transformer oils to 30,000 volt dielectric strength is also claimed for this machine.

#### Perfect Circle's Tipton Plant Establishes Safety Record

SEVEN years without a lost-time accident is the record just accomplished by the Tipton, Indiana plant of the Perfect Circle Company. The last lost-time accident occurred January 24, 1937 and since that time every employee has assumed a personal responsibility for his own and the safety of others. On December 31, 1943, 2,555 days and 2,371,914 manhours were completed without a lost-time accident. If this

ENGINE GENERATOR SETS 5 KW. TO 100 KW.

Duplex Truck Co.

Lansing, Michigan

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#### WEST COAST DIESEL NEWS By JIM MEDFORD

TWO live-bait boats have been equipped with Caterpillar Diesels at the Van Camp Sea Food docks. They are the 60-foot *Oceania* and the 65-foot *New World*.

ANOTHER Newport Beach, California, yard, the Lowman Boat Company, is building a 55foot commercial fishing boat for Walter Hume, Santa Monica to be powered with a Caterpillar Diesel.

AT Crofton's, Fisherman's Wharf, San Diego, the clipper St. Anthony and the fisher Donna Jo have had Buda Diesels installed as auxiliaries.

THE San Diego yard of the Harbor Boat Works is to build a 112-foot clipper to be powered with a 450 hp. Superior. Her auxiliaries will be a pair of Caterpillar Diesels.

ALSO under way at the Harbor Boat Works are a pair of 48-footers. One is for Sam Bompensiero for market fishing and will have a 70 hp. Caterpillar Diesel.

THE Long Beach Boat Shop (California) have completed a number of airplane crash boats all with Kermath Diesel engines (Hercules conversions) and using Twin-Disc reduction gears.

ANOTHER of the short range clippers is also under way at Campbell's for Tony Taraves; vee-bottom, semi raised deck; engine, a 55 hp. Caterpillar Diesel with Twin Disc gears.

A PAIR of Caterpillar Diesels is going into the 96-footer clipper at the Lynch yard, San Diego, for John Cordosa. These 110-hp. engines will drive 75 kw. Fairbanks-Morse generators.

**T**WO clippers to get new Caterpillar Diesel auxiliaries at the Lynch yard are the Senator and the Madelyn R; the first for a 50 kw. generator and the other for operating a line shaft.

TO replace a steam plant, B. C. Packers of

Vancouver, B. C., have installed a Fairbanks-Morse 320 hp. Diesel in their tender, the 110foot P. W.

**B**ECAUSE they couldn't get delivery of two Diesels of the same make, the Coastal Towing Co., Vancouver, B. C., have installed in their tug, Fearless, a 100 hp. Gray and a 100 hp. Mack.

**T**HE Tacoma yards of the Pacific Boat Building Co., have completed the 72-foot single screw tug *ST-381* for the Army: engine, a 450 hp. Fairbanks-Morse Diesel.

•N the Sacramento River there's a new "Diesel boat around the bend"—the 98-foot Patah built by the Army Engineers for handling levee material. And the power is a 125 hp. Caterpillar Diesel driving an 85 kw. generator supplying a variable speed motor turning the 12 ft. stern wheel. Electric equipment is Westinghouse.

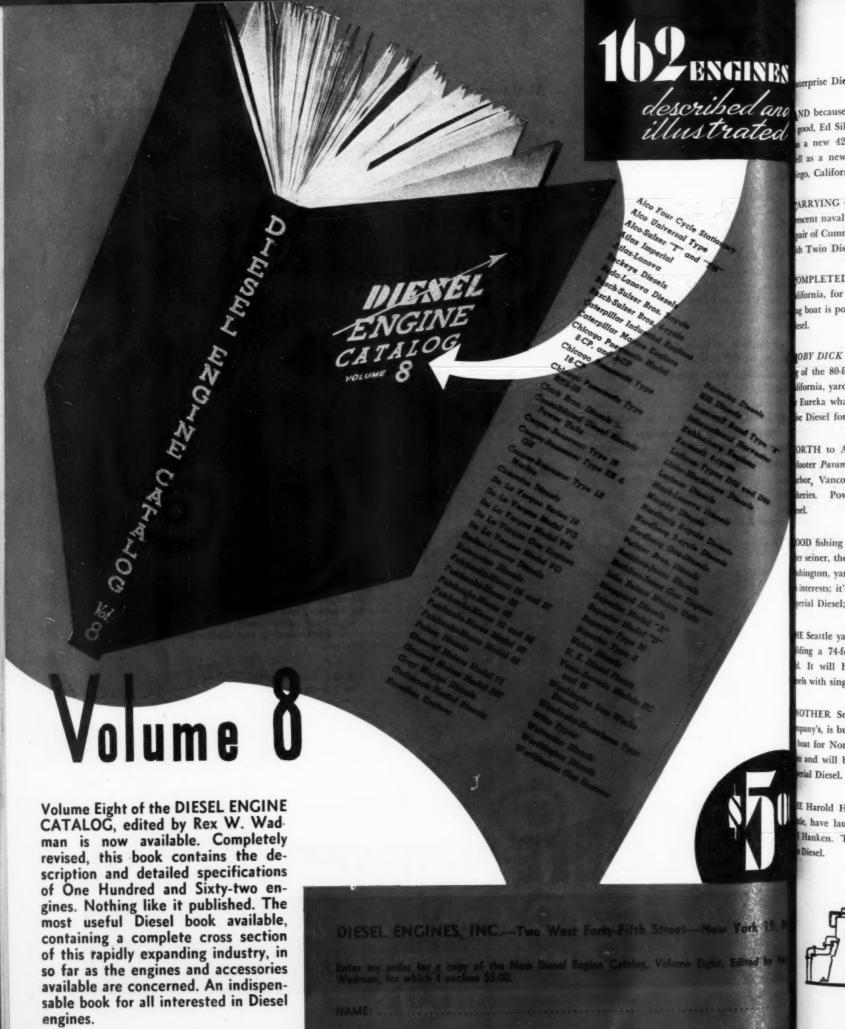
FISH for food continues to get top billing in boat construction: the 80-foot Salvatore Tarantino-owned seiner by W. F. Stone & Sons at Oakland, California, has a 250 hp. at 400 rpm.



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June 1944

OGRESS



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1944

prise Diesel, third in Tarantino fleet.

738

and ND because the first quarter of tuna fishing good, Ed Silva s 115-footer American Clipper a new 420-lip. Fairbanks-Morse Diesel as ll as a new deck house, by Campbell, San ego, California.

> ARRYING 450 passengers, the new Star and escent naval air station ferry is powered with mir of Cummins 150 hp. supercharged Diesels th Twin Disc reduction gears.

> OMPLETED at the Curtola yard, Oakland, lifornia, for A. LaRocco & Sons, the 52-foot ag boat is powered with a 115-hp. Caterpillar

> OBY DICK better watch out with the buildof the 80-foot killer boat by the Oakland, lifornia, yard of East Bay Ship & Repair Co., Eureka whaling station. Power: 250 Enterise Diesel for nine knots.

> ORTH to Alaskan waters will go the new footer Paramount by Menchions yard, Coal rbor, Vancouver, B. C., for Nelson Bros. heries. Power: 200-hp. Canadian Atlas

> 00D fishing first quarter of 1944 brings aner seiner, the 67-foot Victory, by the Seattle, shington, yard of Harold Hansen for Southinterests; it's engine will be a 110 hp. Atlas perial Diesel; F-M pumps.

> E Seattle yard of the Grandby Company is ding a 74-foot seine boat for Lee Wake-It will have a pair of 165 hp. Gray sels with single shaft.

> OTHER Seattle yard, the Prothero Boat pany's, is building a 65-foot seine and utilout for Norm Peterson. She has a 17-foot and will be powered by a 120 hp. Atlas rial Diesel.

> Harold Hansen Boat Company, also of e, have launched a 67-foot halibutor for Hanken. The engine is a 250 hp. Cum-Diesel.







power-weight ratio which permits great power output for their size.

#### SIZES AND RATINGS AVAILABLE

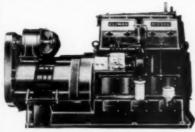
Climax Diesel Electric Plants are made in two sizes. Model DE 148, the two cylinder Diesel unit, is a 15 KVA plant. Model DE 297, the four cylinder Diesel unit, delivers 30 KVA.

#### USE CLIMAX DIESEL ENGINES FOR MECHANICAL POWER

MECHANICAL POWER

The Climax Diesel Engines, which power the above plants, are available for mechanical drives. Model D 148, the two cylinder unit, is rated at 22 h.p., and Model D 297 is a 44 h.p. engine. Both are solid injection, compression ignition engines of the four stroke cycle type.

Write for Climax Diesel Bulletins to Climax Engineering Co., 1822 South Fourth Street, Clinton, Iowa,



is due to their rugged construction and minimum fuel

results from simple design and freedom from com-plicated gadgets. Adjustments and repairs can be made by anyone familiar with ordinary internal combustion engines.

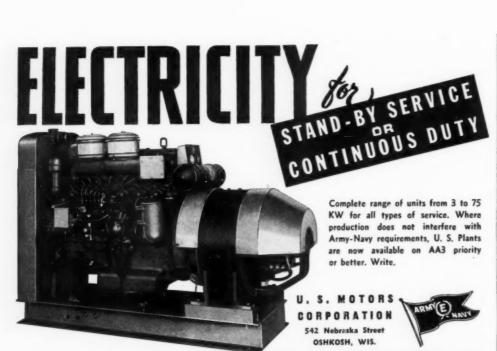
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MINIMUM SPACE IS REQUIRED

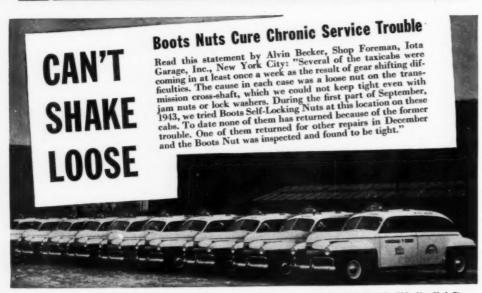
The Climax Model DE 297 Diesel Electric Plant is a Climax four cylinder engine directly connected to a 30 KVA generator,











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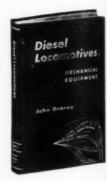
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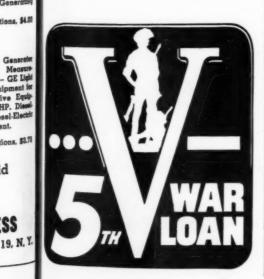
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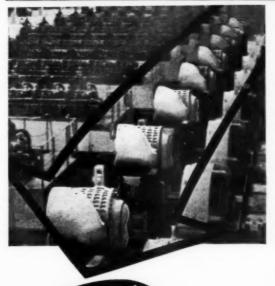
J'm Bahrman

Mr. Bohrman takes over his broader duties in nnection with expansion of Perfex Radiator facilities, which will shortly occupy additional plant area now under construction. This is the fourth addition to the plant in three years, nd will increase the present floor area by

He formerly served in engineering capacities with Hercules Motors Corporation and Waukesha Motors Company, and has been active in the field for eighteen years.



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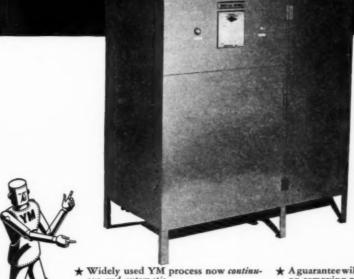
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#### Latest Diesel Patents

A description of the outstanding patented inventions on Diesel and Diesel accessories as they are granted by the United States Patent Offic. This information will be found a handy reference for inventors, engineers, designers and production men in establishing the dates of record, as well as describing the important Diesel inventions,

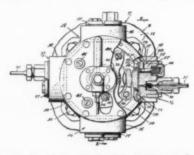
Conducted by C. CALVERT HINES

# 2,322,181 FUEL INJECTING AND METERING MEANS

Edward T. Vincent, Ann Arbor, Mich., assignor, by mesne assignments, to Continental Aviation and Engineering Corporation, a corporation of Virginia
Application August 29, 1939, Serial No. 292,417

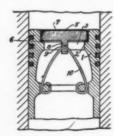
6 Claims. (Cl. 103–38)

1. In a fuel injection system for internal combustion engines, a fuel pumping and fuel meter-ing instrumentality including a pump structure having a chamber provided with an inlet and an outlet, a flexible diaphragm extending trans-versely of said chamber and defining one wall



of said chamber, said flexible diaphragm being initially flexed, means including a push plate contacting at all times with the diaphragm and operable for actuating said diaphragm, stop means reacting against said push plate to limit the inward movement of the diaphragm and adjustable means associated with said push plate and including an adjustable tapered cam follower manually operable to vary the stroke of said diaphragm to vary the volume of fuel displaced from add purpoing instrumentality. charged from said pumping instrumentality.

PISTON HEAD
Franz Neugebauer and Edmund Hartmann, Munich-Allach, and Ludwig Wagenseil, Mu-nich-Obermenzing, Germany; vested in the Alien Property Custodian Application July 21, 1941, Serial No. 403,430 In Germany August 29, 1940 8 Claims. (Cl. 309–9)



6. In a single-acting two-stroke internal combustion engine, a piston consisting of a piston body and a separable piston head provided with a cavity opening toward both front sides, the side turned toward the combustion space being provided with an annular abutment face sur-rounding the mouth of the cavity positioned at this side, said head having at the side turned this side, said head having at the side turned toward the piston body a corresponding abut-ment face adapted to join in an airtight condi-

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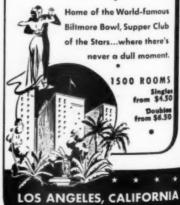
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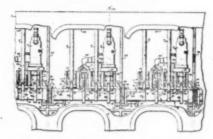
YNCHRO-START PRODUCTS

tion said abutment face of the piston body under the action of the gas pressure in the com-bustion space, said head being devoid of any fastening member.

2.323.209 INTERNAL COMBUSTION ENGINE
CONSTRUCTION
Max Essl, Drexel Hill, Pa., assignor, by mesne

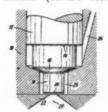
assignments, to The Baldwin Locomotive Works, a corporation of Pennsylvania Application November 27, 1937,

Serial No. 176,872 12 Claims. (Cl. 123-90)



1. The combination with an internal combus tion engine having a frame with a multiplicity of cylinders in line with each other, of a plural-ity of similar camshaft and supporting bracket assembly units, each unit including a bracket having a bearing in which its camshaft is journalled, axial thrust means carried by said brack-et for maintaining its camshaft in a predeter-mined axial position, means for removably sup-porting the brackets by the engine frame so that the unit camshafts are in axial alignment with each other, removable coupling means for con-necting adjacent ends of said camshafts and adapted upon disconnection to allow lateral re-moval of the assembly unit while allowing the other units to remain in position, and a guide carried by said bracket to support a unit cam-shaft when removed from the engine.

2.317.749 FUEL INJECTION NOZZLE
Hans Fischlmayr, Grafelfing, near Munich, Germany, vested in the Alien Property Custodian
Application July 13, 1940, Serial No. 345,362
In Germany March 16, 1939
8 Claims. (Cl. 299–107.6)



1. An injection nozzle and valve for internal combustion engines comprising a chamber hav-ing a substantially cylindrical portion and an end wall having an injection orifice extending therethrough, said orifice having an axial length of not more than half its greatest cross sectional dimension, and a valve member including a subdimension, and a valve member including a sub-stantially cylindrical portion movable axially within said portion of said chamber and spaced from the side walls thereof to provide an annu-lar flow passage between said portion of said valve member and said portion of said chamber, said valve member having an end surface lying closely adjacent said end wall of said chamber in overlapping relation to said orifice, said end surface of said valve member being sufficiently close to said end wall of said chamber when said valve member is in its open position so that the valve member is in its open position so that the resistance to fluid flow toward said orifice in the space between said end surface and said end wall immediately around said orifice is at least as great as the resistance to flow outwardly through said orifice.







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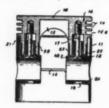
AIRCRAFT ACCESSORIES CORP.
Power Controls Division—Burbank, Calif.
Electronics Division—Kansas City, Kans.

2,317,536
COMBUSTION CHAMBER FOR
INTERNAL COMBUSTION ENGINES
Enrico Hocke, Genoa, Italy; vested in the
Alien Property Custodian
Application March 19, 1940, Serial No. 324,876
In Germany April 1, 1939
2 Claims. (Cl. 123–32)



1. In an internal combustion engine of the liquid fuel compression ignition type, a combustion chamber shaped to permit a rotating or swirling charge of air, and a fuel ignition crossing the path of the whirling air, the interior wall of the chamber being formed with inwardly extending substantially pointed areas, arranged opposite one another on the axis of the rotating air charge and of a volume to cause them to become substantially incandescent under the heat of the charge to initiate ignition of subsequent charges.

2,321,054 PISTON Victor Vostrez, Tobias, Nebr. Application November 22, 1940, Serial No. 366,651 10 Claims. (Cl. 309–14)



1. A piston comprising a skirt of a relatively low expansion metal and a head of a relatively high expansion metal, means for securing said head to said skirt at points spaced inwardly of the outer surfaces of said head and said skirt, the distance between said points of connection being so related to the diameter of the piston skirt across the working surfaces thereof that the product of said distance and the difference between the coefficients of expansion of the high expansion metal and the low expansion metal is equal to the product of the diameter across the working surface and the coefficient of expansion of the skirt, so that the diameter of the piston skirt across the working face thereof remains substantially constant.

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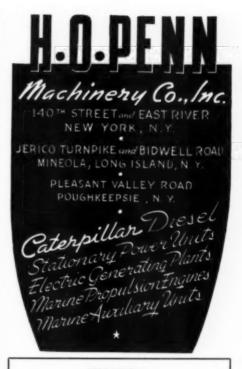
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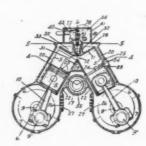
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#### 2.320.648 DIESEL ENGINE

Frederic W. Plumb, Huntington, N. Y. Application July 27, 1942, Serial No. 452,430 11 Claims. (Cl. 123-53)

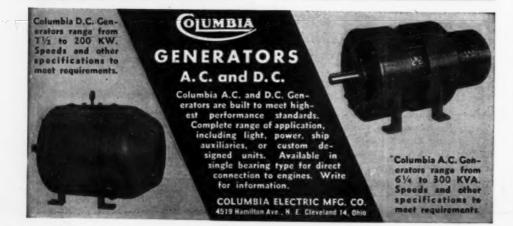
9. A two-cycle opposed-piston engine of the compression-ignition internal combustion type, consisting of a plurality of like units coopera-tively assembled for joint operation, each unit comprising a water-jacketed bent cylinder having an intermediate compression-ignition cham-ber with opposite angularly extending piston bores, and a piston in each bore operatively connected to a crank shaft mounted in a crank casing extension of said bore, a fuel injecting mechanism mounted over said compression-ignition cylinder chamber having an injection plunger opening to said chamber and a shaft

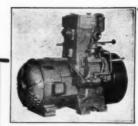


for operating said plunger, a main cam shaft mounted at a central location equidistant from each cam shaft and from said plunger operating shaft, intermeshing gears mounted on said shafts within a casing on the outer face of an end unit, each crank shaft having an end coupling engagement with the crank shaft of its adjacent unit, said plunger operating shaft cooperatively actuating the respective injection plungers of the respective fuel injecting mechanisms a pump corrected by one cam that for plungers of the respective fuel injecting mechanisms, a pump operated by one cam shaft for circulating water through the water jacket of all said cylinders, a pump operated by the other cam shaft for circulating lubricating oil to all of said crank cases, and means for simultaneously and determinedly controlling the amount and timing of the plunger injected fuel oil charges to the compression-ignition chambers of the respective cylinders.

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